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REMARKS ON A COCCUS PATHOGENIC TO MAN AND ANIMALS: STAPHYLOCOCCUS HÆMORRHAGICUS.

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DR. JAMES G. E. COLBY, of Malton, in Yorkshire, informed me some time ago that within a short time he had seen three cases of a vesicular eruption on the hand of patients who some days previously had been skinning sheep spontaneously dead from "gargle" a few days after lambing. Dr. Colby further informed me that "other medical men of his district had seen similar cases of the vesicular eruption in this and other years." At my request Dr. Colby sent me, in glass capillary tubes, a little of the lymph withdrawn, under proper precautions, from the vesicle of the last patient, and this lymph was subjected to bacterioscopic investigation, the result of which I here propose to describe. Before doing so I will give Dr. Colby's account of three cases of vesicular eruption in man in his own words.

The patients all came in from farms on the wolds not less than seven miles away, and opportunity for observation was limited.

Case I.—May 18th, M. R., farmer, complains of a swelling on his left hand, which first came on as a pimple about two weeks ago, and has gradually enlarged. Thinks he got it from a sheep that died a few days after having lambs, and that was attended to and subsequently skinned by him. Feels well in himself. On the left hand, over the head of the fourth and fifth metacarpal bones and base of the proximal phalanges, is a large flat bulla which has already ruptured, and is exuding a thin fluid which is becoming turbid. The skin of the bulla is opaque and thick, and is separated from the tissues beneath by a network of thickened trabeculæ containing the fluid. The surrounding skin is red, and the cubital gland is enlarged and tender. There is no rise of temperature. The whole soon healed after treatment.

Case II.—May 23rd. W. T., 56, shepherd, presents a swelling on the left wrist, and gives the history that it first came as a pimple on May 10th,

that on May 16th he pricked it and let out clear blood. Since May 20th blebs have come out round it. Feels quite well. Now, situate over the left wrist is a flattened vesicle 23 mm. to 26 mm. in breadth, with a slightly depressed cicatricial centre and lobulated circumference. The elevated skin is firm and thick, and surrounding tissues are red and puffy. The axillary glands are enlarged, and the temperature is 99°F. He says that on April 19th he skinned a sheep that died of "gargle." Healing was slow but complete.

Case III.—B. P., farmer, aged 26. Has a swelling on the right hand which was very small when first noticed, but has since enlarged, till now it is 10 mm, by 9 mm. Does not know how he got it, but on questioning says that thirteen or twenty-one days ago he skinned a sheep that died after having three lambs, two of which were born dead. The sheep refused food, wasted, and died in three days. He skinned it two days after death. During the season he lost eight or nine in the same way. He now presents on the back of the second metacarpal bone a well-defined flat vesicle, bluish-grey in colour, and with a slightly depressed centre. He has no pain, and there is little surrounding redness, but the axillary glands are enlarged. The temperature is normal. Fluid was collected in capillary tubes, and forwarded to Dr. Klein; after which it was removed by scraping, and a solution of corrosive sublimate applied.

June 16th. Some erythematous rash on the hands and feet: wound looks well, but there is no apparent constitutional disturbance.

June 17th. Erythema still to be made out.

June 28th. Wound heals slowly.

Remarks.

Single cases of this affection in man have occurred in previous years, and been attributed to various causes, but the connection of these three with diseased sheep is quite clear. The appearance of the lesion in Case II. suggested to others that it was anthrax, and the resemblance was close, but differed chiefly in the absence of necrosis. In sheep the disease locally known as "gargle" appears to be confined to the lambing season, and to ewes which have recently had lambs, though it is said to occur after shearing. It is very easily conveyed from one to another, runs a course like puerperal fever, and is very fatal, the majority dying in three to six days. In some the vulva and vagina are said to become black and occasionally the udder to be swollen, but there is reason to believe that more than one disease is included under the term.

The fluid sent in the capillary tubes by Dr. Colby was of a sanguineous serous character. Examined under the microscope it contained numerous red blood corpuscles and leucocytes and cocci, the latter as dumb bells, but chiefly as small masses. The cocci measured 0·4 to 0·6 μ in diameter, some showing the division into two crescentic granules, common amongst staphylococci.

Plate cultures on the surface of nutrient agar and nutrient gelatine were made by rubbing a droplet of the fluid over the surface of the set agar and set gelatine, incubating the former at 27° C., the latter at 20 to 21° C. In these plates an abundance of colonies came up. In one agar plate I counted over a hundred colonies; in the other agar plate their number in one part of the plate was so great that they were closely placed and uncountable. In the four plates that were made (two agar and two gelatine) I could discover only three colonies which were those of the common staphylococcus pyogenes albus; all the others were of a different kind, but possessed of the same characters.

The characters of these colonies in the plates and in the subcultures made from them in the different media are briefly as follows: On agar the colonies after twenty-four hours are round, moist, flat, white in reflected, brown in transmitted light, only slightly raised above the surface; under a magnifying glass they look granular, thickest in the central part, and possessed of a narrow filmy margin. They grow rapidly in size, and reach in several days a diameter of from 0·2 to 0·5 centimetres, at the same time the marginal filmy zone becoming more pronounced; after about a week each colony possesses over the greater part of its circumference a filmy, more translucent, marginal zone, somewhat irregular in outline and radially striated, the middle part being granular and of a somewhat concentric arrangement. In reflected light the colony already after a few days assumes a light yellowish colour, which, however, never becomes deep, and this colour is observed only on the larger colonies.

On gelatine plates the colonies are noticed already after twenty-four hours under a magnifying glass as minute grey round dots, which show a dark centre and a more translucent margin. After two or three days the colony, while enlarging, commences to sink into a pit in the gelatine, owing to liquefaction; this liquefaction proceeds slowly and gradually, leads to the formation of a circular area of slightly turbid liquefied gelatine, in the centre of which is the whitish mass of the main colony.

In agar streak culture the growth forms a gradually broadening flat band, thicker in the middle, thinner in the peripheral part, the margin of this latter irregularly outlined. The streak is white in reflected light; after some days it assumes a yellowish tinge.

In gelatine streak culture the band of the growth liquefies the gelatine and sinks under the surface; as the liquefaction

proceeds it forms at the bottom of the liquefied gelatine a whitish powdery mass, which after ten to fourteen days assumes a yellowish tint. The liquefied gelatine is slightlyturbid.

In gelatine stab culture the line of inoculation is indicated after twenty-four to forty-eight hours by the linear mass composed of spherical droplets, white in reflected, brown in transmitted light; on the upper free end of the stab there is a whitish plate-like expansion of the growth. Liquefaction commences at the upper free end of the stab after two to three days, the top plate of the growth sinking in; the liquefaction proceeds slowly, so that even after ten to fourteen days it has not reached more than a third or a fourth of the growth, forming in the upper part of the culture a funnel-shaped turbid liquefied mass.

In alkaline broth at 37° C. the microbe grows rapidly, causing already in twenty-four hours turbidity; in alkaline litmus broth the growth is also good; after a day or two the litmus commences to change into neutral, and after two to four days into acid (red).

In milk at 37° C. the microbe grows well; during the first five to seven days the milk remains fluid, but after seven or eight days it thickens, and a separation into turbid whey and casein coagula sets in; this separation is complete after nine or ten days.

On steamed potato at 37° C. the microbe forms a transparent film which gradually thickens in the marginal part; at first it is greyish, and later on assumes a yellowish tinge in the thicker marginal part.

On solidified blood serum at 37° C. a greyish filmy growth appears already after twenty-four hours; this thickens, and after three to four days assumes a yellowish tinge in the thicker marginal part. No liquefaction of the serum is noticed at any time. The microbe dies when exposed to a temperature of 62° C. for five minutes.

From these characters it appears that we have to deal with a coccus which belongs to the tribe of staphylococcus, more particularly to that group which comprises the staphylococcus pyogenes aureus.

Nocard described a coccus, isolated by him from the milk gland in gangrenous mastitis of sheep (*mal de pis, araigné*), with the culture of which he produced, by injection into the milk gland of healthy sheep, the same disease and death. The coccus which we isolated from the fluid of the vesicle on the hand of man is closely related to the micrococcus of Nocard, but differs from it in the following respects: (*a*)

Nocard's coccus liquefies gelatine in stab conspicuously faster than does our coccus; (*b*) Nocard's coccus coagulates milk into a solid mass already within twenty-four hours, our coccus does not coagulate milk before five to seven days, and does not do it in the same way, for the curdling consists in a separation of turbid whey and coagula of casein; (*c*) Nocard's coccus liquefies solidified blood serum, our coccus does not liquefy blood serum at any time.

Of greater importance, however, and indicating a more profound distinction between Nocard's and our coccus are the following facts:

1. The coccus of Nocard is found associated with, and causing, gangrenous mastitis in milk sheep; our coccus was isolated from a vesicle on the hand of a man who had skinned a sheep that had died, not from gangrenous or any other mastitis, but soon after lambing.

2. The gangrenous mastitis (*mal de pis, araigné*) in milch sheep has, according to Nocard and his informants, a considerable distribution in some districts in France, where the milk of sheep is used in making Roquefort; yet there is nowhere any mention made of a cutaneous infection of human beings. If the two diseases in the sheep—namely, gangrenous mastitis (or *araigné*) and the puerperal disease from which the Malton sheep died—were the same, and the two microbes identical, such a cutaneous infection of human beings as occurred in Malton could not have been wanting in France, considering the number of sheep affected with *araigné*, and the number of men attending to their milking.

3. A striking difference between the two microbes is, however, shown by the behaviour of their cultures on guinea-pigs. Nocard's coccus injected subcutaneously into guinea-pigs, even in large doses of otherwise virulent culture, produced at the utmost a rapidly passing local swelling; in the rabbit large doses produced swelling and local abscess; cultures of our coccus, on the other hand, prove very virulent for the guinea-pig. A small dose of a serum culture, a moderate dose of a gelatine, or recent agar culture; for example, a few drops of the turbid condensation water in a serum culture, 1 to 2 platinum loops of a gelatine culture several days to several weeks old, 1 to 2 loops of an agar surface culture twenty-four hours to four days old, when subcutaneously injected into the groin of a guinea-pig of 200 to 300 grammes body weight, causes already after twelve hours hæmorrhagic œdema in the subcutaneous and muscular tissues, extending rapidly over the inside of the thigh, groin,

abdominal, and thoracic walls, and even into the neck; death, according to the virulence of the culture, takes place in from twenty to sixty hours. Serum cultures act most virulently, causing death in twenty hours. Gelatine cultures stand next in virulence. Agar cultures prove virulent up to the fourth or fifth day, later than this the virulence diminishes considerably causing a circumscribed hæmorrhagic œdema, but the animal recovers. After a week, agar culture does not produce even local hæmorrhagic œdema. Broth cultures behave in a similar way. When quite recent they prove virulent; after six or seven days their virulence is greatly diminished. The virulence can be re-established by transference to serum cultures, or gelatine or agar cultures.

When the animals die, the following condition is found on *post-mortem* examination; the subcutaneous and subjacent muscular tissues of the thigh, groin, abdomen, chest, and even neck are much swollen, containing a considerable amount of sanguineous serous fluid; there is no gas and no odour. The liver is pale and small, the spleen and lungs are not abnormal; the peritoneum and serous covering of the intestine are, in a percentage of cases, greatly injected, and the peritoneal cavity in these cases contains sanguineous fluid. The subcutaneous exudation shows, under the microscope, numerous red blood corpuscles and leucocytes, an abundance of cocci as single cocci, as diplococci, and as small masses. The protoplasm of the leucocytes is densely filled with the cocci. The peritoneal exudation, when present, possesses the same characters. Cultures made of the subcutaneous fluid yield pure cultures of our coccus, so does the peritoneal fluid; the heart's blood yields, on culture, only a limited number of colonies, a loop of blood yields between 10 and 15 colonies only. Intraperitoneal injection of a small dose (1 to 2 loops) causes death from intensive peritonitis already in 6 to 10 hours. The peritoneal cavity contains copious sanguineous fluid, in which are seen red blood corpuscles and numerous leucocytes; the protoplasm of the latter is densely filled with the cocci; the fluid part contains the cocci also in great abundance.

Very small doses of virulent, or larger doses of attenuated, culture cause, on subcutaneous injection, general illness, passing off after two or three days, with local œdema, which, after several days, disappears. Such animals acquire hereby a certain, though not a very high resistance against large doses of virulent culture.

In the rabbit the result after subcutaneous injection is this:

general illness and extensive hæmorrhagic œdema, which leads to necrosis of the skin over the abdomen. Death takes place from general marasmus in about three weeks.

Owing to the lambing being over at the time when the above investigation was commenced, no further cases of sheep dying after lambing were available, and, therefore, the investigation of such sheep has to be postponed till the spring of next year; but I have inoculated healthy sheep with virulent gelatine culture of our coccus, a sixth subculture being used for the purpose.

Two healthy sheep were injected subcutaneously into the thigh with a bouillon suspension of a gelatine culture, about one-fourth of a culture being used for each animal. Next day both animals were found ill; the temperature was raised (104°F.), and the animals did not feed; the leg of the injected side was swollen and retracted, the swelling extending over the whole leg and the groin, and the skin being dark red and hot to the touch; the muscle and subcutaneous tissue puffy. The animals could not stand or walk.

On the third day the condition was much worse, both as regards the general state as also that of the injected leg. Temperature 105·8° in the morning, 106·2° in the evening, breathing very rapid. At the end of three days one animal was found moribund; it was killed, and on *post-mortem* examination the following condition was found: the skin of the groin and thigh of the injected dark red; on cutting into it and exposing the subcutaneous and muscular tissues extensive œdematous hæmorrhagic swelling of both tissues is found, with copious sanguineous serous fluid. Under the microscope this fluid contains numerous red and white blood corpuscles and cocci in clusters and as dumb-bells.

No growth of cocci or any other microbes was obtained by culture from the heart's blood, but cultivation in the plate and in tubes with a trace of the subcutaneous fluid yielded innumerable colonies of the cocci, which on subculture proved exactly the same as were used for the injection. No disease of the viscera could be found.

With a loopful of the growth of the sheep's exudation on the surface of agar after twenty-four hours' incubation at 37°C., a guinea-pig was injected subcutaneously. The animal died in twenty hours with exactly the same appearances of extensive hæmorrhagic œdema as were described above.

On account of the effects produced in the guinea-pig and sheep after subcutaneous injection, I propose calling the microbe staphylococcus hæmorrhagicus.

With the same agar culture, namely, that obtained from the sanguineous exudation of the above sheep, and which proved virulent for the guinea-pig, I inoculated in five simple punctures the skin on the dorsum of my own left hand. Next day all the punctures were raised and surrounded by an areola; there was rather an unpleasant itching, but I felt in no way ill, and the temperature was normal. After forty-eight hours the punctures had somewhat further advanced, each puncture being a fairly distinct papule surrounded by a spreading areola: the itching was now rather troublesome; the general condition and body temperature were normal. After seventy-two hours in two of the punctures the papules were well raised, and in their centre was distinct accumulation of congealed serum; the other three punctures, though pronounced papules, were not so well raised, but in all five punctures the areola was well marked. General condition and temperature normal. Local itching rather troublesome. After four days in two of the papules distinct accumulation of pus in the depth could be made out; in all punctures the superficial part commences to scab; the areola is still pronounced, but a little less broad than on the previous day; the elbow pit a little painful, and its glands just to be felt. General condition normal. After five days same condition. Areola receding; no pain or swelling in the elbow pit. After six days scabs on all punctures distinct, areola only indicated.

By the tenth day the scab and superficial epidermis over the original areola desquamating. By the sixteenth day only two of the punctures still show signs of desquamation, the other three are just indicated as dark spots.

On the sixth day I got out from one of the pustules a little purulent matter; on examining it under the microscope and in culture our staphylococcus was found in abundance.

The inoculation with agar culture in our case was, therefore, by no means so pronounced as in the case of the natural infection of Dr. Colby's patients, but it was sufficiently well marked to indicate a positive result.

In conclusion, I wish to mention the fate of the second inoculated sheep. This animal remained very ill for ten days; it could not stand or walk, its temperature remaining high, being 105° morning and 105·6° in the evening; the animal drank a lot of water, but, although fed by the attendant, consumed very little food. With the third week it began to mend in a very decided way, the temperature falling to 104° or 104·6° respectively, and the skin of the thigh

becoming necrotic, the animal could and did walk, though it did not use the leg of the injected side. By the end of four weeks its temperature was still 104°, the injected leg not being used for walking; the animal fed fairly well, but was extremely emaciated.

CRITICAL PERIOD IN THE DEVELOPMENT OF THE HORSE.

BY J. C. EWART, M.D., F.R.S., REGIUS PROFESSOR OF NATURAL HISTORY, EDINBURGH.

PROFESSOR EWART presents a small brochure on this subject, with splendid illustrations. The text is concise and lucid, and, although written on a scientific basis, is well within the range of intelligent breeders, and may be defined as a scientific answer or explanation "*Why breeders experience so many difficulties with their brood-mares during the earlier weeks of pregnancy.*"

Professor Ewart simplifies his work by reference to the apparatus provided for nourishing the chick and corresponding structure in one of the simple manuals. The differentiation between the size and function of these allantois in the chick and opossum are lucidly described in the text, with a sharp definition of the various structures in the plates.

The most entertaining part of the work is, however, the portion showing that although the horse-embryo, at the commencement of its fœtal life, presents the same simple characteristics as the opossum-embryo, nevertheless, it soon reaches a higher stage, and it is then that the critical period so ruinous to horse-breeders commences, and the ovum is liable to be cast off by loosing its "anchorage to the uterine wall."

It is also noteworthy that a seven week embryo has many characteristic changes at this period. The supply of nourishment from the yolk sac is about at an end, the Allantoic villi come into action, and the mouth of the fœtus is open, whereas at eight weeks the mouth is closed; and unless countless villi sprout the embryo dies from starvation, and is discharged. Professor Ewart sums up as follows:—There is a certain amount of danger at the end of the third and sixth week, but the seventh week and beginning of the eighth week is the most critical in the life history of the horse embryo.

The conclusions are of the greatest practical value. That mares should be acclimatised before being served, and

thoroughly adapted to changes of food. Mares, especially excitable ones, should be served in the evening, and kept in a state of quietude until periodic disturbance has subsided. The other conclusions regarding feeding, &c., term of service, are well known to most breeders. The subject is one of great difficulty, and we congratulate Professor Ewart on the masterly manner he has investigated and elucidated the difficult problem he undertook, not only from a scientific point of view, but commercially as well.

PARASITISM AND ALLIED STATES.

THE more one observes the habits of plants and animals the more and more is one impressed with the great similarities between their habits and those of human society. There is, in fact, scarcely a relationship existing between members of the human family but can be paralleled among plants or the lower animals. The term symbiosis is employed by the biologist to express the relations or the unions—harmful or useful, or neutral—which are found to exist between plant and plant or plant and animal, or animal and animal. The general term symbiosis following Van Beneden's excellent classification, includes messmatism, partnership, parasitism, and we may add philanthropy. Excluding philanthropy, illustrations of which in the lower forms of life would be hard to find, for here the principle acted on is nothing for nothing, we will examine briefly the other three conditions.

The term *Messmatism* applied to such cases where two animals live together, where one benefits by the life in common, while the other does not suffer by the companionship. The one receives board or lodging from, without loss of any kind resulting to, the other. Thus the epiphytic orchids of the tropics hang on to supporting plants, but by means of their leaders and ærial roots make their own living. The Remora fish fixes itself to the shark, but feeds itself, as also do the crustacean Cirrhipedes, which are found attached to whales. A curious case is that of a little Peruvian crab which is said to live in the intestine of a sea-urchin, and near the end, "so as to seize as they pass by all those living creatures which are attracted by the odour."

Partnership.—The essential condition underlying partnership is that each brings something which makes for the common good. Both partners benefit. In the plant world a most familiar example of such a partnership is that existing

between a species of bacterium and the members of the natural order Leguminosæ, viz., beans, peas, clovers, etc.

If a clover or a lupine be dug up a number of little knobs will be found in the roots. Each one of these knobs is a little house, formed by a swelling of the tissues of the plant filled with bacteria. These bacteria, first of all, live off the plant, but later changing their form they fix the free nitrogen of the air, work it up into a combined form, and hand it on to the plant in the form of nitrates so essential to the plant's life. Again in lichens we have another illustration of a partnership between two plants. A lichen is a composite structure, being made up of two plants, an alga and a fungus. The green alga manufactures the necessary carbohydrates, which it shares with the fungus, to receive in return the equally necessary albuminous food. In the radiolarians, which are among the simplest of animals, we have an example of a partnership between an animal and a plant. Little yellowish one-celled plants are found in the substance of the radiolarian. These algal plants, partly nourished on nitrogenous food received from the animal, take also of the carbon dioxide given off by the animal in breathing, and in presence of sunlight make use of the carbon dioxide in the manufacture of starch, which may go to nourish the animal. Besides, this starch formation is accompanied by a giving off of oxygen which the radiolarian can make use of in its vital processes. Two animals that may strike up a partnership are the hermit crab and the sea-anemone. The crab, covered by the sea-anemone, perhaps receives some useful concealment from its own enemies, while certainly it is also enabled the easier to approach its prey. Even if the crab does not share its spoil with the masking anemone, the latter must benefit by frequent change of pasture ground as it is carried about by the active crab.

Parasitism.—In this relationship there is the idea of harm introduced. One form preys on another living form, doing, it may be, nothing for its own support. There are all grades of parasitism from the cases where the host is only weakened by the drain on its resources up to absolute loss of life. Parasitism is as common in the vegetable world as in the animal world. The mistletoe is a partial parasite, doing something by its leaves for its own support, but sending sinkers into the host tree, and stealing from it the salts taken in by its roots. The dodder (cuscuta) is a complete parasite. With no roots in the soil, and with leaves hardly worth the name, the dodder twines itself round clover or flax, and living

entirely off the host-plant accomplishes the death of the latter, not, however, before the parasite has provided for the continuance of the species by a bountiful production of seeds. Finger and toe, the potato disease fungus, rust of wheat, and ergot of rye are other examples of plant parasites.

Certain bacteria and moulds are plants parasitic on animals, while nearly every animal group has among its members some parasitic forms; almost without exception the animal parasites of the domesticated animals belong to the protozoa, or to the worms, or to the insect or spider group, and here, again, we find every grade of parasitism represented. The gadfly visits wounds for a meal, and then departs. The scabinites live on the outside of their hosts, and cannot exist long away from them. The "flukes" spend part of their life in the open and part of it in the tissues of their hosts. So, too, many of the round worms, while the tapeworms, except, perhaps, for a short time as eggs, pass their lives exclusively in the inside of their hosts. Complete parasitism always means degradation in the structure of the parasite. The locomotor organs necessary for a free life degenerate, sense organs may disappear, even a mouth and alimentary canal may be absent as in the tapeworms. Generally speaking, in such forms, as a sort of compensation, or, at any rate, as a provision against the risks in the life history, we get a great development of the reproductive system and a tremendous egg-laying. Just as with many fungi parasitic plants, so with many parasitic animals associated with their abundance of food and the absence of difficulty in procuring it, there may be an additional vegetative or a sexual means of multiplication.

A LAND FLOWING WITH MILK AND BUTTER.

UNDER the above heading the *North British Agriculturist* is giving a series of articles on Danish farming, by the Editor, who has recently made a tour of inspection in that country with the view of examining into some startling statements which had been made by the Royal Commission on Tuberculosis, regarding the prevalence of tuberculosis in Denmark, and the sanitary condition of the dairies in that country. From the fifth article of this series we give the following extract:—

The second excursion which we propose writing a brief account of was made in the vicinity of Aarhus, Jutland, in company with our old friend Mr. Appel. Aarhus is a good-sized town, beautifully situated on a slightly rising ground

stretching up from the harbour. On the outskirts of the town, numerous pretty but modest villas are seen through the densely planted orchards in front of them, and further out from the town fruit growing and market gardening are carried on to a considerable extent. As we drive still further out into the country, we find the land of generally good quality and well cultivated, the weeds in the grass and other crops being much less conspicuous here than in most other parts of Denmark. The clover crops, as well as the grain crops, are very good, and the mangolds are well brairded, and give promise of giving a fairly heavy yield.

Our destination for the day is Constantinsborg, a model farm owned and occupied by Mr. Pontopiddan, one of the merchant princes of Hamburg and Denmark. As we drive on in the direction of this model farm, we pass a loch of rather a large size for Denmark. "That's not so big as Loch Shin which you and I passed when we went to Shinness to see the Duke of Sutherland's Highlanders," said Mr. Appel, as he pointed to the placid sheet of water lying between two gently rising stretches of land on either hand. Denmark is by no means a "land of the mountain and the flood," for eminences such as would be called hills in this country are few and far between in that country; but reed-producing marshes are comparatively common there. A good few of the farms in the Aarhus district are of large extent, while others are small, and, in not a few instances, the steadings of the smaller farms are grouped in twos and threes by the roadside. The steadings of quite a number of the larger farms are of comparatively modern construction, and are roofed with wood covered with felt. As there is an extensive marsh at no great distance where there is abundance of river reeds, and as it is a characteristic of the Danish farmers to abide by the cheapest kind of farm holdings, we inquire how it is that the proprietors of these large farms have adopted the felt-covered wooden roof. Mr. Appel readily furnishes a satisfactory reply to this inquiry. Thunderstorms are very frequent and very destructive in Denmark, and farm steadings roofed with river-reeds or thatch are very liable to be destroyed by these thunderstorms. Where several steadings are grouped in close proximity to each other, it has frequently happened that the Bolt of Jove, which set fire to one steading, wrought destruction to the others by the flames or sparks being carried in their direction, and there is now a tendency to have the steadings of the smaller farms built farther apart from each other than formerly. On accouut of the heavy losses frequently caused through steadings roofed with river-reeds or thatch being so frequently destroyed by thunderstorms, the rates of insurance for such steadings are relatively high, and the proprietors, therefore, when repairs or renewals of buildings are required, are discarding the thatched roofs, and giving preference either to the felt-covered wooden roofs or to roofs composed of wooden "slates." For the same reason, these proprietors are making the internal fittings of their byres and other premises of iron instead of wood, with fire-proof floors overhead, so as to reduce as far as possible the risk of damage by lightning, and those who do so get lower rates of insurance for their buildings and stocks against fire. But the smaller class of peasant proprietors are still clinging to the reed-thatched roofs, because those are cheaper at the time of erection.

The farm of Constantinsborg is an extensive holding beautifully situated on a moderately steep brae, rising up from an extensive reedy marsh. The dwelling-house is a roomy building, and, as is usual with such buildings in Denmark, the one side of it overlooks the courtyard immediately adjoining, while the other side overlooks the lawn and garden. As we drive up to the front we again note another feature of Danish agriculture which we had noted elsewhere. The Danes are an exceedingly polite people, and nearly everybody in Denmark lifts his hat and makes a most courteous bow to every other

body at meeting or parting. But the scientific expert, when he makes a visit to any of the dwelling-houses of the landed proprietors, does not ring the bell and wait till Jeames Yellowplush, or someone of lesser importance, shall see fit to open the door and explain whether the master be in or not. On the contrary, the expert, with characteristic courtesy, gives a gentle tap at the door, and then walks straight into the parlour as if he were the most intimate friend in the world. This fact of itself may serve to show how thoroughly the importance of agriculture, as the one great industry of the country, is appreciated in Denmark, and also how thoroughly the services of the Danish Government's experts are appreciated by the landed proprietors of that country.

A large part of the steading of Constantinsborg is of comparatively recent erection, and it is quite a model one in its way, though not so compact and well designed as most of the better class farm steadings in Scotland. Unlike the vast majority of the steadings in Denmark, some money has been spent on making it tasteful and even ornamental in appearance, as befits the homestead of a merchant prince. Its byres are done up in the way above described for reducing the risk of damage by lighting, the only division between each pair of cows being an iron bar running diagonally from the ground to the ceiling, the floor overhead being also a fireproof one. In the older part of the steading is a large storeroom, rather below the level of the ground, and fitted up with great concrete vats into which the water can be run at will, and the milk-vessels can be set for cream-raising on the old Schwartz or Cooley system. This was the system of cream-raising which formerly prevailed in all the better-class dairies in Denmark, but the invention of the cream-separator has changed all that. And here we must note also that the proprietor of Constantinsborg has set a much-needed example to his fellow-agriculturists in Denmark by having a supply of water laid on by gravitation to his steading from the higher ground beyond. In this respect, Mr. Pontopiddan has proved himself much wiser than an enormous proportion of Danish farmers, who are content to draw their water supply from a well sunk within half-a-dozen yards of the dungstead. The stock of cows kept on Constantinsborg are of the old Dutch breed; and in this respect, also, the farm is somewhat singular, for farmers in Jutland, as a rule, are strongly in favour of developing to the very utmost the milking properties of the native breed, and keeping them pure. As is the case with the vast majority of steadings in Denmark, the dungstead at Constantinsborg is open, for the Danes have not yet learned to appreciate so fully as they would need to do the importance of roofing in the dungstead, by way of preventing a large part of the best and most soluble part of the manure from being washed away. Of course, a covered dungstead is not a desideratum there as it is in this country for the winter feeding of fattening cattle, for practically all the cattle stocks kept in Denmark are milk cows or heifers intended for dairy uses, the male calves, except such as are intended for bulls, being turned into veal at a very early age. There was nothing out of the usual in the agricultural practice at Constantinsborg, but the land was well cultivated and in good order.

After seeing over Constantinsborg we had a good look at some smaller farms, but there was nothing particular to be seen about them, the buildings all being of the most primitive order, and the proprietors working as hard as an Irish labourer on piecework. Returning to Aarhus in the cool of the evening, we saw some pleasant Arcadian illustrations of how "the kye come hame" in Denmark. As has been previously noted in these articles, there are practically no fences in Denmark, and the cattle, sheep, and horses are all tethered to stakes in the field when grazing. In the evening the herd-boy goes out to the field, pulls up the stake, ties the rope at the proper length, and goes off towards the steading, leading the whole herd behind him. The native breed of Jutland are good sized cows of sharply defined black and white colours.

THE STRUCTURE OF BACTERIA.

THE actual intimate structure of micro-organisms is a subject which has as yet received but little attention from English bacteriologists. It is not revealed by the methods of staining, or, indeed, the amount of magnification which suffice for diagnostic purposes, and its study has the double disadvantage of requiring special skill, and leading to no obvious and immediate results of practical clinical importance. Nevertheless, much time has been devoted to it by Continental observers, and M. Duclaux, in an excellent summary of our present state of knowledge, in a recent number of the *Annales de l'Institut Pasteur*, refers to a formidable list of forty memoirs bearing upon it.

The opinions expressed show a good many discrepancies, mainly arising from a common cause. Differences of structure in normal bacilli are very hard to detect, for the whole protoplasm appears homogeneous; it is, therefore, necessary to study them, either when they have become old and are commencing to disintegrate, or with the aid of colouring reagents. The question then arises as to how far the appearances then presented may be taken as indications of the normal structure. The plasma of the bacteria is a gelatinous substance readily coagulating with the aid of heat or reagents. This has been shown by Butschli, who has actually succeeded in squeezing out this gelatinous material from its envelope. The ease with which the jelly coagulates under different circumstances is one of the main sources of difficulty in its differentiation. One set of observers, among whom A. Fischer and Migula are conspicuous, regards a bacillus as consisting of a capsular membrane, containing a mass of protoplasm with a central vacuole, but no nucleus. The vacuole, however, depends too much upon the viscosity of the protoplasm, and, therefore, upon external conditions to have, in Duclaux's opinion, the importance assigned to it by them. Migula, in fact, considers that the division of a bacterium is preceded by binary fission of the vacuole. Butschli, on the other hand, has studied bacteria and larger, but almost as lowly, fungi, the cyanophyces, by faintly colouring them with acid hæmatoxylin. He distinguishes a bacterium into three parts, a membrane which does not take the stain at all, a faintly staining peripheral zone, and the much-discussed deeply staining central body.

Butschli considers this central body to be, if not a nucleus, at least allied to one in its nature: he has twice, in the case

of Beggiatoa, been enabled to detect karyokinesis in it. No difficulty is found in accepting this view as regards the cyanophyces, in which, although large, the central body does not entirely preponderate; but in the smaller bacteria it is found to occupy the whole membrane, the protoplasm being reduced to a mere semilunar thread at each end. This assumption that a bacterium consists practically entirely of a nucleus, with the nutritive protoplasm reduced to a minimum, has not been generally accepted by bacteriologists. Metchnikoff has well compared it to the condition in embryonic cells and in myeloplaxes—that is, where nutritive activity is greatest. Duclaux suggests that protoplasm is, so to speak, the kitchen for the nucleus, which, when in a very active state, can take in its food raw. It will possibly be found that when storage of starch, etc., takes place in a bacterium, protoplasm may be developed around the nucleus as a "tissue of reserve."

Another most interesting question is as to the histology of spore formation. Babes was the first to demonstrate in a number of bacteria, and particularly in that of diphtheria, minute particles taking a violent or reddish strain with methylene blue, and so standing out in sharp contrast to the blue ground. They were most numerous at the centre and extremities of the rod, as if associated with division and growth: he gave them the non-committal name of "metachromatic granules." Butschli has described them as mainly occurring in the thin protoplasmic layer already mentioned. Certain of them appear to take part in the formation of spores, and here again a difference of opinion has arisen. Ernst described "sporogenic granules" staining with hot, but not boiling, methylene blue, as appearing in certain bacilli under conditions favourable to spore formation, and running together in places to give rise to spores. But Bunge pointed out that these granules were present in some bacilli which did not form spores, and absent in typical spore-bearing forms such as the anthrax bacillus; and further, that, unlike spores, they did not resist boiling water. He himself describes granules staining less easily than those of Ernst, which appears to fulfil these conditions; they require treatment with an oxidising agent before they are capable of taking the ordinary stains. In the anthrax bacillus three or four rounded granules can be seen, which eventually fuse into an oval spore. These granules withstand the action of boiling water, and in this respect, and the difficulty with which they are stained, agree throughout with the spores themselves. This

would seem to show that the difficulty of staining the latter is due to a quality of the material in which they are composed, and not to their being developed in an impermeable membrane.

One final point remains for solution: to bring the conclusions of Butschli and of Bunge into harmony it must be shown, as Duclaux points out, that the granules of the latter are formed by the "central body" of the former. This is an important thesis for future observation.

REPORT ON THE WORKING OF THE ARMY VETERINARY DEPARTMENT WITH THE SUAKIN FORCE, 1896.

BY VET.-CAPTAIN HENRY T. W. MANN.

[WE have been favoured with a copy of this Report, which was endorsed by Vet.-Colonel F. Duck, and sent by him to the Adjutant-General for India. We make no apology for presenting the following extracts to our readers, who, we are sure, will find them very interesting, especially at this time when trouble seems to be brewing in the East. The Report is thus described by Colonel Duck: "Vet.-Captain Mann, Vet.-Lieutenant Moore, and the subordinate staff, have evidently taken the greatest interest in their work at Suakin; they have carried out their various duties under a trying climate with zeal and intelligence, and I consider they have done credit to the Army Veterinary Department. The Report is most interesting and useful"]:—

Fittings for Animals on the Transport Vessels.

My remarks on the fittings apply to all the vessels. They were old, unnecessarily heavy and cumbersome, and some of the removable parts could only be taken out of position, or replaced, with the greatest difficulty; others were too short or long; this was because the fittings had, originally, been made for vessels of different dimensions to those of the ships used on this occasion. The fittings were not padded.

The defects are detailed in the following paragraphs:—

All feeding troughs should be of zinc, similar to those used for officers' chargers; these can be kept clean and sweet. In the tin-lined wooden ones which were in use, the tin tears away, leaving jagged edges; serious cases of laceration about muzzles and jaws were caused by this. As the troughs were only partially lined with tin, the wood became impregnated with the sour moisture from the damp food and saliva, and retained so offensive an odour that animals,—especially horses,—often refused their food. Wooden troughs can neither be washed nor scraped clean.

The troughs had curved iron suspenders fitting over the breast beams; severe contusions and lacerations resulted from animals lurching forward against these. I would suggest that troughs should be fastened to the breast-

bar by means of flat hooks, dropping into sunk iron sockets riveted to the *front* of the bar.

All the bars and uprights should be padded. It is very necessary that the cross-bars (only a few inches above the heads) should be protected; cases of poll injury occurred from this not being so.

The numbers of wounds from lack of padding on other beams and uprights were very numerous; we wrapped all the available blankets round the bars, but there was an insufficiency for the requirements.

The terrible wounds and injuries, which the mules on the "Lawada" sustained, would have been prevented altogether, or greatly minimised in degree of severity, if the fittings had been padded.

The side-bars were all at the same level; they are the right height for Arabs and country-breds, but are four inches too low for ordinary-sized Australian horses; if the vessel pitches much it is possible for a horse to be thrown over the side-beam. I saw a case occur.

The breast-bars were, I consider, too high for transport animals; it would be practicable to adjust the side and breast beams to any required height, by having the uprights bored with holes a few inches apart, and the clamps in which the bars rest secured by bolts and nuts.

Some vessels had no battens on the flooring of the upper-deck "standings," in others they were so defectively arranged, on both decks, that a very insanitary condition resulted. Five battens were placed transversely to the long axis of the stall, but no provision was made for the escape of urine into the scuppers; it therefore collected in the spaces between the battens. The standings could neither be swept, or flushed out thoroughly, and as there was no exit for fluids, they were never clean or dry.

Instead of battens being continuous across the standing, each should be "spaced" in the centre to allow liquid to escape into the scuppers through a channel in the end balk.

Where there were no battens, matting, sand, etc., were put down to give a more secure foothold, but this is not sufficient where there is a sea on.

Remarks on the Vessels.

The "Lawada" (used as a hospital ship) was not well adapted for carrying animals in one respect. No. 4 hatch extended back beneath the poop, and was practically without fresh air. Moreover the hatchway was not in the centre of the hatch. That it should be near the middle is a matter of importance, as facilitating a free and sufficient ventilation.

Some of the vessels were overcrowded, when the number of men and animals (also the kits which encumbered the decks) are taken into consideration. The number of spare stalls, in accordance with the regulations, were not available.

Speaking generally, the facilities for, capabilities of, and arrangements to promote ventilation were satisfactory.

It is very desirable that something in the way of refuse "shoots," or openings, should be provided on the lower decks of ships conveying animals. The only way of disposing of the manure and sweepings was to poke it by hand through the portholes, but owing to their small size and height above the deck, the process was an exceedingly long and unsatisfactory one.

I would suggest that it would be a simple matter to have a large square port, almost level with the lower deck, on each side of the ship in horse-transports; a "shoot" could be run through this during stable-hours and the manure thrown down it. The ports suggested could not, of course, be used in heavy seas.

Standings ought not to be erected opposite, or in cl ose proximity to the engines, on either upper or lower decks; the animals' heads were hanging almost over the engine-room, and the intense heat from there had so serious an effect that it was necessary to vacate these particular stalls; this entailed occupying the few spare standings we had.

The carrying of fowls on ships conveying horses, etc., is to be deprecated; there were a number of coops along the centre of the vessel, close to the horses' heads; the parasites (lice) from the fowls got into the hay in the nets and so on to the animals, causing great irritation. The effect needs seeing to be appreciated; it was impossible to check the attacks of the lice by applications to the horses' skins, and some of the animals rubbed themselves raw.

The Voyage.

The duration of the voyage was ten days; the weather was fine; owing to the prevalence of head winds the sea was heavy, and the motion considerable.

The intense heat and humidity caused the animals to perspire profusely day and night. During the first few days the animals neither fed nor drank freely; they were nauseated by the motion and by the odours which, on the upper deck, were due to the filthy fowl-coups. Strips of dusootie, dipped in phenyle solution, were hung about the decks; this plan had a freshening and deodorising effect on the air.

As much as possible the usual stable duty routine was followed, with the additional precautions in the care of animals which a voyage necessitates.

The water used was that brought in tanks from Bombay. Watering took a long time, as each bucket had to be carried from the tanks; it was possible only to water twice in each period of 12 hours. This is not sufficient in hot weather; horse-transports should have taps to the tanks and long lengths of hose.

The diet was gram and bran in equal proportions, and hay; all three of good quality.

On the "Chyebassa" there were 316 animals and 240 men. Crowded with these and the kits, the lower deck could not be thoroughly cleansed—as the hatchways to the hold had to be open—owing to the stores of fodder coming flush up to the deck; there was an insufficiency of scuppers for carrying off the water. The fore-hatch of the lower deck was the most insanitary spot in the ship, the vessel was "down by the head," and the urine from the standings flowed into this quarter in large quantities; it had to be removed continuously in hand utensils.

There was only one maund (80 lbs.) of McDougall's powder on board. Although disinfectants should never supersede cleanliness, the above quantity is an utterly insufficient provision for a 10 days' voyage with 300 animals. Other vessels were equally ill-provided. I recommend permangate of potash for use on ships, as being cheaper, more portable, and more efficacious.

Many cases of colic occurred in dock; these were due to inattention to the regulation about not watering or feeding horses shortly before being slung on board. During the voyage a large number of animals were under treatment for the lice from the fowls; 23 serious lacerations were caused by the torn tin-linings of the feeding-troughs, and there were 19 severe wounds from the trough-suspenders and unpadded beams; there were eight cases of fever, nine of colic, five of congestion of the lungs, and three of heat apoplexy; these latter were in imminent danger for several days. No deaths occurred on the "Chyebassa."

Loss of Mules on s.s. "Lawada."

The "Lawada" arrived at Suakin on the 8th June, 1896; during the voyage 51 animals died, viz., 40 ordnance mules, 9 baggage mules, and 1 pony of No. 5 Bombay Mountain Battery, also one mule of the General Hospital.

Nearly all the surviving animals had abrasions or bruises, some very serious, others slight. The mules were debarked as quickly as possible, and 13 very serious cases admitted at once into the Field Veterinary Hospital. Two of these died almost immediately, one with the lungs in a gangrenous condition, the other from pyæmia resulting from extensive lacerations; two others are in a critical condition from pleurisy.

The vessel, instead of leaving Bombay on the 23rd May, was detained until 10 p.m. on the 26th. Outside the harbour she encountered the full force of the first burst of the monsoon. There were only five per cent. of spare stalls below and none above; there were no battens in the upper-deck stalls.

Some of the heavy water-tanks got loose from their lashings; the vessel made such heavy weather, and the confusion and obstruction caused by the numerous casualties to animals were so considerable that it took 16 hours' continual labour to water the mules twice.

In No. 1 hatch,	22	animals	died	out of 45.
In the main „	17	„	„	22.
In No. 4 „	12	„	„	85.

In some places the mules were lying three deep on each other; the carcases could not be got at owing to the overcrowded state and violent motion of the vessel, and became in a dreadful state from distension and putrefaction; in two instances the bodies were not extricated for 36 hours.

Most of the deaths occurred between 6 o'clock one evening and 6 o'clock of the next morning.

The fittings were as ill-adapted as I have previously described; owing to many of the breast-bars being too short they slipped out of the clamps, and mules were pitched forward right out of the stalls, some being thrown from between-decks on to the orlop deck below.

Owing to the shipping of heavy seas, the windsails had to be removed, and pâls rigged up over the hatchways, practically preventing all ventilation. The ports had to be kept closed.

The vessel was overcrowded, and the big ordnance mules were placed two in a stall, instead of in separate standings, as the regulations provide. This prevented anything being done to support them by extemporised slings, and left no space to enable men to get fallen mules on their feet, or to reach and remove the carcasses. Also decidedly enhanced the severity and increased the number of injuries inflicted upon fallen animals, for these were trampled upon by the others.

The upper deck was occupied by 85 commissariat cattle (slaughter); as the battery began to embark at 4.30 p.m., and the ship had to leave the same evening, there was not time to remove the cattle from the upper to the lower deck, and place mules there instead; nor could this alteration be made, owing to stress of weather, until the lee of Socotra was reached.

The mules ought to have been on the upper deck and in No. 3 hatch only —which was amidship when there was least motion. The fact that none of the cattle on the upper deck died proved that it would have been the best place for mules. The comparatively valueless cattle should not have been shipped in the "pick" of the accommodation; this should have been reserved for the expensive ordnance mules.

No fewer than 40 ordnance mules were lost. This, no doubt, was owing

to these being bigger and heavier than the baggage animals—consequently, relatively more overcrowded.

The terrible wounds to the buttocks, breasts, etc., were preventible, and would not have occurred if the fittings had been good and padded.

I am of opinion that the animals died from asphyxia and acute congestion of the lungs—induced by the foulness of the air. This must have been deleterious in the extreme in consequence of it being necessary to remove the windsails, cover the hatchways with pâls, to keep the ports closed, and from the presence of the putrefying carcasses. That direct violence was not the cause of the deaths was borne out by the fact that there was no fractures of any kind.

I certainly consider that mules should have been in No. 3 hatch instead of men being there; these should have been lodged forward. In horse-transports the animals ought to be the *first* consideration; they can do nothing to alleviate the distress or discomfort they suffer, while men can help themselves.

I do not approve of slinging at sea because animals are apt, with this support, to rely entirely upon it, and not to depend upon the resistance they can offer to the motion of the vessel by using their legs and feet; to enable them to do this it is absolutely essential they should have a good foothold; this can only be secured by having battens across the stall-flooring.

I consider it very necessary that the animals should be in single stalls, and that the breadth between the side-bars should be only just sufficient to admit of the body; support by side-bars is greater, and more efficacious, than any which can be afforded by slings.

A new pattern of fittings—on the lines of those used on the Australian horse-ships,—is very desirable.

Brief Description of Suakin.

Suakin, in a military sense, comprises Quarantine and Suakin Islands; also that portion of the mainland known as "El Klaff," which is surrounded by a fortified wall. The islands are connected to the mainland by narrow raised roadways constructed through the shallow water. The bay in which they lie is united to the Red Sea by a channel running through the coral reef edging the coast.

The landing-piers and the condensing works are on Quarantine Island.

The population, consisting of a few Europeans—the remainder being Egyptians, Arabs, and Soudanese—numbers about 8,000: this computation does not include the nomadic natives encamped outside the enceinte.

The islands and shore, for some distance inland, are coral rock, overlain with sand. The houses are built of blocks of Madrepore coral.

From the coast the plain rises in a westerly direction for a distance of about ten miles, with an elevation of between 200 ft. and 300 ft., there it reaches a volcanic range of hills. In a two-mile radius of Suakin the country is fairly open, north and west; beyond the radius, in a south-westerly direction, it is covered with a thick scrub of prickly mimosa bushes, 6 to 8 ft. in height.

The country is arid and sterile to an extreme degree: cultivation is impossible, owing to the sandy nature of the surface and the paucity of water. There are no trees or any vegetation whatever, except thorny bushes—chiefly wild caper, cactus, and mimosa; a small salt-shrub grows near the sea, and more sparsely in the desert. It is obvious that the neighbourhood can be drawn upon for nothing in the form of supplies.

At Tokar, 45 miles away, crops of "dhoura" (the Indian "jowari"), and grass, grow luxuriously after the flood-water from the river reaches there. The flood occurs in July—August; as a rule it takes 14 days for the overflow to travel to Tokar.

The climate is. from a variety of reasons, excessively trying to men and animals in June, July, August and September ; the frequent showers of heavy rain, in October and November, caused the results which might be expected to follow exposure to wet.

It is necessary to take precautions to avert the ill-effects which are the sequalæ to sudden and treacherous changes in the direction of the hot winds, the differences in day and night temperatures, etc. Fixed rules are inadmissible ; sometimes the nights are suffocatingly hot, at others a breeze comes from seaward and causes,—by chilling,—numerous and obstinate cases of fever and derangement of the digestive and hepatic systems.

Up to the middle of June the air was comparatively dry ; after that the atmosphere became humid, causing profuse perspiration both day and night ; this had a most enervating and debilitating effect.

The heat can only be described as furnace-like and scorching ; the intense glare and the frequent blinding sandstorms added to the extreme distress endured.

The degree of temperature varied in accordance with proximity to the sea ; in the buildings near there it was frequently between 104° and 109° ; in the huts of officers near the Strata Gate it was constantly 108° to 112°, occasionally 114°. At night it usually fell to 92°-94°.

The temperatures of ailing animals could only be taken at dawn and after 8 p.m. ; otherwise the clinical thermometer became so instantly affected on exposure to the external air, even under the sheds, that its record was valueless.

The dewfall varied much. It became noticeable at the end of June ; in August-September the dews became very heavy ; the clothing of animals standing in the open was often wet through in the mornings.

A light shower occurred at the end of July ; there were others subsequently at long intervals.

No record exists, so far as I could ascertain, of the average in previous years. Heavy showers fell from the 20th October, and were intermittent until cessation on the 15th November.

Hot winds, called "The Kamsin," blow very frequently from the desert ; usually in the day, sometimes at night. Once, in July, the Kamsin blew without cessation for three days and nights. The winds cause indescribable distress ; numerous cases of fever and pneumonic congestion were due to them. There is always a light hot wind from the desert during the day : the prevailing day direction is north-east, at night south-west. Late in October a northerly wind sets in.

Sandstorms were very prevalent during the first three months ; they are called "Haboob." A fall in temperature of a few degrees in the hot months was always accompanied by these storms. Usually they began soon after dawn, when the surface-temperature had been somewhat lowered by the night breeze : if the sea wind had sufficient force the sandstorms were swept inland over the desert, but if the land breeze were the stronger the air was full of flying clouds of sand. When at their worst no out-door work was possible.

The storms caused many cases of conjunctivitis.

At Tokar the surface is clay-dust ; until the end of August storms were continuous day and night ; they ceased about 3 p.m. and began again at 7 p.m. daily.

On the evening of 20th August, when the horses of the cavalry at Suakin were being taken to water, a sudden and exceptionally violent sandstorm arose ; the horses were so startled by the pelting gravel and sand that the whole number stampeded into the desert ; all were ultimately recovered. One horse fell down a 50 ft. well, and, after being got out, died from the injuries sustained ; there were many minor cases of wounds and contusions.

Some of the horses and men were thrown down by the force of the wind; four men had limbs fractured. There was a heavy loss of horses' blankets and men's lungis; they got loose in the sorm and were blown away.

Water Supply.

At Suakin the sources are the wells, the condensers, and the pulsometer.

At El Teb and Tokar there are wells.

At Trinkitat there is no water. That required for the convicts there, and a certain quantity needed for dal-cooking purposes by the Indian troops at Tokar, was sent by sea fortnightly to Trinkitat, and stored in tanks.

The water is drawn up from the wells by drums worked by hand, and conveyed through pipes to the Artillery trough and town tanks.

At El Teb the wells are in the fort: they are of good construction, and there is an ample supply of water.

At Tokar there are three wells; one is often dry: average depth is 54 ft.; they are very narrow and riveted part of the way up with branches,—to support the sandy sides. The water is drawn up in the native leathern buckets: great care has to be exercised, as a bucket colliding against the wall causes much sand to fall. It occupied four hours to get up sufficient water each time for the horses of the cavalry squadron.

The pulsometer was worked on completion of the tank reservoir in October; the capacity of this is 23,000 gallons. Nine hours' work gave a result in storage of 21,000 gallons; with a coal consumption of 0·4 ton; cost, about 9s. A 3 in. pipe from the 4 in. main supplies the tanks and troughs now placed close to the Shata Gate: the capacity of these tanks is 5,000 gallons; they take 1 hour and 40 minutes to fill at the rate of 50 gallons per minute. I am indebted to the Commanding Royal Engineer for the informa- regarding the pulsometer.

There are two condensers situated on Quarantine Island; water for condensation is obtained from the sea.

The superintendent informed me that the machinery is somewhat worn and old; each condenser, however, is capable of producing from 140 to 150 tons of water per diem: one ton of coals is expended in condensing 19 tons of water.

The semi-fluid salt residiuum is returned to the sea.

The water is stored in reservoirs; one has a capacity of 250 tons; from these it passes through pipes to tanks in various parts of Suakin, for issue therefrom.

The cost of production—working expenses, without allowing for wear of plant—is something over 4s. per ton: it is sold to vessels which call in the harbour at 6s. a ton. The daily consumption of condensed water (used for drinking and cooking only) by the force was 50 tons per diem.

Properties and Qualities of the Water.

The flat, unaerated, condensed water decomposed rapidly under the influence of the intense heat, if confined in small closed vessels, such as bottles or chatties: it had a repulsive odour in the course of a few hours.

The water of the Shata wells is only slightly brackish when first drawn; the brackishness much increased after the water had stood a few hours in the open tanks and troughs; this change was due to the blowing in of particles of surface sand, which contained a large percentage of saline constituents. This view of the matter is borne out by the fact that after rain the water does not become nearly so brackish, not on account of the rain-water which has

found its way into the wells, but because the sand and dust are "laid," and do not get blown into the troughs, etc.

The quantity of salts in the soil is very considerable. After a shower, when the water has evaporated or sunk into the ground, the surface is covered with a thick saline efflorescence.

Brackish water causes diarrhœa in animals for the first three weeks or so that it is drunk; after that, in the majority of cases, it has not this effect.

The Tokar water suited the animals; they were better in health, appearance, and condition, than those at Suakin; I believe this water benefited them to a material extent.

Mica abounds in the soil at Tokar; particles are found in suspension in the water.

I made an inspection every day of the animals of one unit of the Force; by this system the animals of the whole strength were seen by me at least once in the course of each week; slaughter animals were examined every third day. All horses and mules proceeding upon, and returning from, detachment and convoy duties were invariably inspected. Of course such a routine as the above necessitated the expenditure of much time and incessant work over and above the numerous other daily duties, but I consider too great an importance cannot be attached to the frequent and thorough veterinary inspection of each animal when on field service: it is the only method enabling a quick detection of disease to be made; and of making patent what changes in diet, etc., will benefit particular animals.

The immunity from all diseases of a contagious or infectious nature which the animals, as a whole, escaped, will testify to the very satisfactory results of the continual inspections; by the latter means, diseases in individual animals were prevented from dissemination in the Force, for precautionary measures were promptly adopted. If diseases are not detected until they have advanced to a stage which declares itself to the unprofessional eye, it is obvious that the probability is, the maladies—if specific—have already been communicated to other animals.

Through the courtesy of His Excellency the Governor, instructions were issued to the Egyptian police to detain outside the gates any sickly looking animals, of whatever class, belonging to natives coming into the town; the Mahmour (head of police) informed me of any such detentions, and, having inspected the animals, I was authorised to deal with the cases as I thought fit.

I consider this arrangement as an important one, as it practically nullified the chances of the *introduction* into Suakin of any contagious affection.

With the permission of the Governor, I also made weekly inspections of all the horses, mules, and camels of the Egyptian police; also of the mules of the Egyptian battalions.

I treated all the cases in the above animals, as there was no veterinary officer of the Egyptian Service at Suakin. The medicines were refunded on requisition.

Constant care was exercised in all matters tending to promote the well being of the animals—such as the quality of the forage and fodder, the dieting, the protection from the sun or chills, by clothing, the hours when it became necessary, etc.

These were all matters of moment, requiring very frequent alterations owing to the exceptional nature of the climate, surroundings, and circumstances. Attention to these matters,—with a view to the maintenance of a general state of good health in a large body of animals, and the early adoption of all methods likely to prevent, or defer, deterioration in the standard of efficiency, is of more eminent importance than the curative measures which the omission of precautions would probably render necessary.

The Cavalry horses and other animals were frequently taken into the sea

for a swim; this was beneficial exercise and most refreshing to them after standing for hours streaming with perspiration and covered with dust; care was taken that the swimming was over before the sun got low, so as to avoid the danger of contracting chills while drying. One horse had to be kept from this exercise as he persistently drank sea-water in large quantities, and consequently, after a few days, got extremely thin.

The greater number of the animals had to stand in the sun without shelter; it was necessary that these should have a folded blanket on, along the spine; this increased the perspiration, but could not be dispensed with. To afford sufficient protection and, at the same time, to minimize the heat caused by the blanket, the following plan was adopted: I can recommend it as practical and efficacious:—

Cylindrical bolsters, 11 in. in length and 4 in. in diameter, were made of gunny canvas and filled with bhoosa; the folded blanket is placed on the horse's back and a bolster on each side of the withers and spine; the blanket is then drawn up between the bolsters so as to leave an arched air-passage along the back; the surcingle is strapped over all, to keep in position.

The free edges of the blanket should be at the shoulders; the folds being to the rear offer a greater resistance to the wind, and are less easily blown forward, which would expose the loins.

Burning carcasses was only adopted in cases where the nature of the diseases rendered this procedure necessary. Stable litter alone will not incinerate a carcase, but as the local supply of wood is scanty it was only indented for when absolutely necessary.

Other bodies were buried in the desert, about 2½ miles beyond the wall; the carcasses were cut open to facilitate decomposition.

Proceedings of the Royal College of Veterinary Surgeons and Veterinary Medical Societies, etc.

ROYAL COLLEGE OF VETERINARY SURGEONS.

(*Continued from page* 100.)

Special Meeting.

A special meeting of the Council was then held for the purpose of considering notices of motion by Mr. Mulvey and Mr. Dollar. The President, Professor Penberthy, occupied the chair.

The Secretary read the minutes of the last special meeting, which on the motion of Mr. Mason, seconded by Mr. Mulvey, were signed as correct.

Motion by Mr. Mulvey.

The President: I now call on Mr. Mulvey to bring forward his motion with regard to the alteration of bye-law 67.

Mr. Mulvey: Gentlemen, the necessity of an alteration of bye-law 67 is known to most of you. It is simply to clear up the wording, which, on the face of it, does not give sufficient instruction as to the education of the student when he has failed at his fourth examination. I therefore propose to move the elimination of the words "His first, second, or third," and the substitution of the words "any professional." This will necessitate the student going back to the school at which he was educated, and going through the necessary education in order to fit him for the examination. The whole thing was

discussed at our last meeting, and gone so fully into on both sides that I think it is merely necessary to move the alteration of which I have given notice.

Mr. SIMPSON: I beg to second the motion. For the information of those members of the Council who have not bye-law 67 at their fingers' end, or a copy of the Register before them, perhaps I may be permitted to read it as it stands. "A student who is rejected at his first, second, or third examination, shall not be eligible for re-examination, unless he gives satisfactory proof of having attended the lectures and general instruction of the school at which he was educated during the interval between such rejection and the ensuing examination." The alteration of our rules with regard to the number of years a student shall remain at a college renders it necessary that this bye-law should be altered, inasmuch as no mention is made of what is to become of a student after rejection in class D or fourth examination. As this bye-law stands it is possible for a Scotch student to be rejected in his class D examination, and to come up for re-examination at another institution on the 30th June. I think all the teachers will agree that that was never intended, and that it is not advisable, either in the interests of the students or in the interests of the profession generally. I, therefore, have much pleasure in seconding Mr. Mulvey's proposition.

Mr. VILLAR: I cannot help feeling that if you accept this proposed alteration of Mr. Mulvey's we shall all of us, as a Council, be dealing very harshly with a class with whom I am sure we all sympathise very much—the rejected students; and, particularly, one class of rejected students, I mean the kind of man who is known at our schools as a good theoretical man, a man who reads hard and is thoroughly well up in theory, who knows his morbid anatomy and pathology, and yet who, from some cause or another, is not well up in the practical details of the profession. If you insist upon his coming again to the colleges you treat him harshly in two ways. In the first place, after he has passed all his examinations except his last, you send him to the colleges, and put him to additional expense, and make him attend a course of lectures of which, probably, he is already in possession of very full notes indeed; and, in the second place, you actually debar him from going into practice, and getting that knowledge which is an absolute necessity to him. If this bye-law is to be amended at all I cannot help thinking that it would be very much better to amend it so that a student may have the option of going, if he likes, with a veterinary surgeon into practice, and that a certificate should be given from the Principal saying that he had been with him during the interval. That, I think, should be sufficient for the Council of this College. A man, when he goes in for his fourth examination, and is fresh from school, has been through four examinations already, and he knows something of examiners and examinations. He ought, also, to be able to recognise his own weak points. I say, gentlemen, we ought to give such a man the discretion of doing what he likes, provided he comes up again, and tenders himself for re-examination after a sufficient interval. I think a certificate from a veterinary surgeon stating that he has put in a certain amount of time since his rejection ought to be sufficient for this Council.

Professor W. O. WILLIAMS: Theoretically I quite approve of the sentiments that have just been expressed, but I am very much afraid that busy veterinary surgeons who have a large practice will not be inclined to have a stock of young students who will not do anything but hang about smoking and playing billiards. The majority of these young men would probably go to a veterinary surgeon who has just started practice. and he would probably get six or eight of these youths loafing about his place who would earn absolutely nothing, do nothing, and learn nothing. Theoretically I quite agree with you, sir, but practically I do not think you can work it out.

The PRESIDENT: If no one wishes to say anything further I shall put the motion which has been moved by Mr. Mulvey and seconded by Mr. Simpson. The bye-law as proposed to be altered will read as follows: "A student who is rejected at any professional examination shall not be eligible for re-examination unless he gives satisfactory proof of having attended the lectures and general instruction of the school at which he was educated during the interval etween such rejection and the ensuing examination."

The motion was then put and agreed to.

Motion by Mr. Dollar.

Mr. DOLLAR: The motion which I have to propose is as follows: "That in case of each and every person summoned by the Registration Committee of the Royal College of Veterinary Surgeons to defend a charge of conduct disgraceful to him in a professional respect who shall enter a defence, a full report of the charge and of the defence, whether delivered in writing or by word of mouth, shall be kept by the Secretary of the Royal College of Veterinary Surgeons, and that in the event of the Council of the Royal College of Veterinary Surgeons directing the name of the said person to be removed from the Register, such report shall be published in the professional journals not more than three nor less than two months after the date of such direction, except in the event of the said person waiving his right to appeal to the Privy Council, when the report shall be published on receipt of notice from him to such effect." I have already introduced this motion to the notice of the Council, and it has to a limited extent been discussed in the professional journals. I shall not, therefore, detain you very long. The reasons which have induced me to bring forward this motion are—firstly, a somewhat growing feeling of dissatisfaction which I believe exists in the profession in regard to the conduct of some of our investigations. That feeling of dissatisfaction or distrust is, I believe, ill-founded, and I regard the manner in which the Registration Committee conducts its business as quite exemplary. At the same time it would be foolish on our part to utterly disregard that feeling. There is undoubtedly a strong objection in these later days to secret tribunals of any description, and whether the secret tribunal has been a Star Chamber, or an Inquisition, or any of the other forms of tribunal which have existed throughout the ages they have been found generally less efficient from the point of view of doing justice than open tribunals; and I think that all the traditions of our country point to a throwing open of all trials to the public. I do not propose in this motion to go as far as to throw open our Registration Committee—which is really a court of professional justice—to the public, nor even to the profession, but what I wish to do is to place our procedure on exactly the same basis as that adopted by the legal profession. The legal profession, I believe, hears its cases *in camera*—I am open to Mr. Thatcher's correction—the case is then submitted to one or more of Her Majesty's judges to decide as to the procedure to be adopted; and, once the sentence is pronounced, an account is published in the newspapers, so that everyone may know exactly how the offence was committed, the nature of the offence, and the nature of the penalty. I may say that not only will this be a great advantage to the accused persons, but it will have another and much more important effect on the members of the profession, namely, it will enable them to discriminate as to what are and what are not offences "disgraceful in a professional respect." A very great outcry has been made during the last year or two since the Registration Committee has been acting more vigorously, and renewed appeals have been made to the Council as to what are and what are not offences disgraceful in a professional respect. I submit that it is an exceedingly difficult thing to produce such a code, and that possibly it would scarcely be desirable to

attempt it; but by keeping an account of the cases which we have before us (I only propose that defended cases should be reported) and, in the event of our inflicting a penalty, publishing the evidence and finding of the court, I think we should be taking a great step towards educating the body of the profession on that point as to what is and what is not "conduct disgraceful in a professional respect." I think that if that alone were the reason for passing this motion, it would be a sufficient reason; but considering that we of all the great learned professions are perhaps the last to maintain entire secrecy in regard to our professional trials, I think the day has now come when that anomaly should be removed, and that we should let the profession into our confidence as to the grounds and the methods we pursue in inflicting penalties under our powers. I therefore beg to propose the motion standing in my name.

Mr. LAWSON: I will second that.

Mr. SIMPSON: I rise for the purpose of inviting Mr. Dollar to withdraw his motion—at any rate, that portion of it after the words "Shall be kept by the Secretary of the Royal College of Veterinary Surgeons." I agree to some extent with this motion—that it is desirable a true record of what takes place at the Registration Committee should be kept in the archives of this Institution. To the words that I now read I make no exception, "That in cases of each and every person summoned by the Registration Committee of the Royal College of Veterinary Surgeons to defend a charge of 'conduct disgraceful to him in a professional respect' who shall enter a defence, a full report of the charge and of the defence, whether delivered in writing or by word of mouth, shall be kept by the Secretary of the Royal College of Veterinary Surgeons." And there I suggest this resolution should stop. I venture to think that in the case of any unfortunate member of the profession who, from mischance, or from a desire temporarily to set at defiance the rules of the College, and who afterwards regrets his action, the punishment of having to appear before the Registration Committee is ample. I say it is no business of ours to publish to the world the punishment that has been inflicted upon such a man by our body.

Mr. DOLLAR: With due submission, I thought I had made the wording of the resolution amply clear,—that we only publish the result in the event of a man's name being removed from the Register. It would only be a report of such exceedingly bad cases as call for the exercise of our powers in removing a man's name from the Register; it would not be exercised at all in the event of any less penalty being inflicted. I only desire that the cases be reported where the names are removed from the Register. If the man is such an offender that his name should be removed from the Register, I say that it is no additional penalty to have a report of his case published. If the man is such an offender that he deserves additional punishment, we owe it to the profession to give them reasons why we have removed his name from the Register, and to give them a full report of the proceedings.

Mr. SIMPSON: Mr. Dollar does not give me full credit for having read his notice of motion carefully. I assure him and the Council that I fully understand the object of the resolution, and I still say we have no right—and even if we had the right, in mercy we ought not—to publish the man's name to the world in order that his neighbour may taunt him with it, or use it to his prejudice in practice. Mr. Dollar has referred to the method pursued by the legal profession. I, like Mr. Dollar, can be corrected by those gentlemen who have a greater knowledge of the legal profession than I have, but, so far as I know, the legal profession conducts its inquiries in precisely the same way that we do, the only difference being that the legal profession do not possess that power which, fortunately, we do. The Incorporated Law Society have no power of themselves to remove a man's name from the Register of

Solicitors; they must, before doing so, lay the evidence before the judges, but not for publication. I venture to challenge any gentleman here to say whether, in the report of the proceedings in a court of law connected with the removal of a man's name from the Register, the man's name is mentioned. All you will find is the fact that a solicitor's name is proposed to be removed from the Register—we will say for fraud or some other offence. When the judges have decided that the man's name is to be removed the name is then given in full.

Mr. DOLLAR: Precisely.

Mr. SIMPSON: And that is all. I say there is no advantage in giving to the profession such reading as they would be put in possession of should Mr. Dollar's suggestion be carried out. It may form excellent material for reading in our veterinary journals, admirable reading, but I venture to think, in the interests of these unfortunate people, we should not be acting, at any rate, mercifully if we do as Mr. Dollar suggests. The Registration Committee, if it errs at all, errs on the part of consideration for the reported offenders: and I do hope that so long as I am associated with the Registration Committee, either as its chairman or as an ordinary member, the feelings of those who are reported to us, and who are, after all, our brother practitioners, will be considered as they have been done in the past. In the event of Mr. Dollar not seeing his way to withdraw his motion, I beg to propose as an amendment that all the motion after the words "shall be kept by the Secretary of the Royal College of Veterinary Surgeons" be deleted.

Mr. TRIGGER: In this matter I am bound to say I find myself at issue with the chairman of the Registration Committee, for I think he has entirely over looked one important fact. Mr. Simpson says that we punish these men sufficiently. He seems to have overlooked the fact that Mr. Dollar's resolution, as I understand it, only deals with men who are absolutely struck off the register, and Mr. Simpson says for the purpose of argument, "why should these men be taunted by their fellow-practitioners?" I would remind him that they are no longer practitioners. They are struck off the register, and you cannot make it too public when that is done. When I first glanced at this resolution I was entirely opposed to it, but since I have read it carefully I have come to the conclusion, and have no hesitation in saying, that when we strike a man's name off the register for disgraceful conduct we are certainly bound to publish to the veterinary world, through the veterinary journals, the fact that such a man has been struck off. The time has come when you ought to let the profession know why we have struck a man's name off the register. For these reasons I intend to support the resolution as it now stands.

Mr. MULVEY: I also support Mr. Dollar's resolution, and I do so because I believe that every action in the working of a committee like that of the Registration Committee should be open and above board. I would also say that that Committee has carried on its work in a most open manner, and that every information has been given to those gentlemen who have been summoned before it. I believe a record has been kept of every case that has been brought before us. The minutes will prove, I think, that every case has been recorded, and that a record of all that has been done has been kept.

Mr. DOLLAR: Publication is everything—that is the essence of my motion.

Professor EDGAR: I think this motion, as it stands, would do very well to be placed by the side of the old hanging in public days at Newgate. After a man has been punished and charged as he is, surely it would be sufficient if the fact were notified in the public press that he has been struck off the Register of the Royal College of Veterinary Surgeons for fraud, drunkenness, or whatever it may be; but to give a full report of the whole proceedings seems entirely to be calculated to suppress what we always hitherto had in

inquiries by the Registration Committee, viz., free and unsuppressed discussion. If we are to be held up, as we shall be under this state of things, we shall be practically posing as public informers, and it will not be possible, if you carry this instruction, to eliminate from the report any remarks which are made at the Registration Committee. I think to a certain extent the principle upon which Mr. Dollar is going is a good one, namely, that it should be notified that a man has been struck off the Register; but to go so far as to pin us to the necessity of publishing in the journals the full details of the arguments on both sides seems to me to be very reprehensible.

Mr. DOLLAR: A full report of the charge and defence.

Professor EDGAR: Who is to be the judge as to what is to be eliminated from the discussion? Who is to abridge it if you are going to admit the principle of abridgment at all? I object entirely to the fact of our being compelled to publish a full report. The committee having acted on their own judgment upon the facts brought before them, and having come to the conclusion that a man is worthy of being expunged from the register, I do not object to that being published at all; I think he merits it clearly. But I think it would not be wise to publish all the facts upon which we base our finding. If we pass this resolution as it stands we should be compelled to publish the whole details of the registration of these proceedings, which are and ought to be to a certain extent *in camera.*

Mr. WARTNABY: I should like to ask Mr. Dollar what the object of this particular motion is. So far as I am able to gather, it seems to me that the only advantage—and I am prepared to admit that possibly it is an advantage—of this notion is to vindicate the action of the committee in taking so serious a step as striking a man's name off the register of our profession. Beyond that I see no good in it. If that is the object—that our duties should be made public—well and good, and I agree with Mr. Dollar. Bur there is one other matter I should like to mention now we are on the subject. My idea is that we are not taking quite the right steps when this question of striking men off the register, or, indeed, of dealing with serious offences, is referred to a committee. When these men are brought up on a charge of such a serious character, I think they ought to be brought up before the Council as a whole.

Mr. VILLAR: It just occurs to me that it is possible the Council as a body, or the members individually, if a full report of the proceedings is published, might lay themselves open to an action for malicious publication or slander. I should like an assurance from the solicitor that the funds of the College would not be spent in defending us in such a way.

Mr. ABSON: Would the case be met by substituting for the words "such report" "such fact"? The *fact* that a man's name had been struck off the register would then be communicated, instead of a *report.*

Professor MCFADYEAN: I take it, sir, that in all punishments there are two main objects in view. The first is to take steps to prevent the criminal from repeating the act; the second is to use the punishment as a warning to others. Now, I am one of those who think that the offender is sufficiently punished by simply being struck off the Register. On the other hand, I think there is much cogency in the reasoning put forward by those who urge that the fact of a man being struck off the roll ought to deter others from repeating his offence. I have made a suggestion to Mr. Dollar of almost exactly the same character as that made by Mr. Abson, namely, that he should amend his resolution to read as follows: "That in the event of the Royal College of Veterinary Surgeons directing the name of such a person to be removed from the Register, intimation of the fact shall be sent to the professional journals for publication."

Mr. DOLLAR: Will you say "facts"?

Professor MCFADYEAN: No, only the fact that he has been removed.

Mr. BARRETT: That would do it.

Mr. ABSON: That is my point, Professor McFadyean.

Mr. TRIGGER: With great respect I might point out that that is done, because the report of the Registration Committee goes to the profession, so that the fact of a man being struck off is already published.

Mr. SIMPSON: I think the proposal made by Mr. Abson, which was so well supported by Professor McFadyean, is an exceedingly happy solution of the difficulty, and will probably save a division. It is a fact that we do report to the Council that number so-and-so has been struck off. We not only do that, but we give the name, and it does go to the professional journals. At the same time I admit there is no direction that it shall be so; and I heartily approve of the suggestion made by Professor McFadyean. What I objected to throughout the whole of the argument was the publication of details—the last dying speech and confession, as it were.

Professor McFADYEAN: There are really two alterations involved in my suggestion. The first is that the details of the accusation and the defence are not given, and the second is that as it at present stands we should be bound to publish this in the professional journals. I take it, that might raise the question that came up before—who is going to pay for it? I would suggest that the motion should read "Intimation of the fact shall be sent to the professional journals for publication," and they can please themselves.

Mr. ABSON: I would withdraw my suggestion in favour of that.

Mr. SIMPSON: May I withdraw my amendment and second the proposition made by Professor McFadyean unless Mr. Dollar proposes to adopt it.

Mr. DOLLAR: I am prepared to take that portion of Professor McFadyean's suggestion which will make it permissive for the journals to publish or not as they please. I am perfectly sure the journals will be only too pleased to do so.

Mr. SIMPSON: To publish what?

Mr. DOLLAR: To publish the details.

Mr. SIMPSON: Oh, no.

Mr. DOLLAR: The point upon which I am afraid I must stand, although it may probably result in the losing of my motion, is that at least reasonable details of the reasons which guided the Registration Committee, and the grounds on which they acted, should be given to the public.

Mr. THATCHER: They invariably appear in the report.

Mr. DOLLAR: I have not seen them.

The PRESIDENT: Can you refer to a report giving the men's names and the reasons?

Mr. SIMPSON: Yes. They do seem to appear.

Mr. DOLLAR: It is only in the case of a man being struck off.

Professor EDGAR: Is not the whole sting of the publication of this matter that it should be done as an item of news separate from the stereotyped report of the Registration Committee, which would at once catch the eyes of the profession? If it appears in the Registration report, it is passed over, and we here even do not know the cases have been published. We have forgotten. But if we see a little item of news stuck in at the bottom of the paragraph entirely separate from the ordinary report of the Council, we at once see it, read, and perhaps remember it.

Mr. ABSON: To expedite business, I will second Professor McFadyean's amendment, and we can then take the feeling of the Council.

Mr. TRIGGER: I rise to a point of order. There can be no amendment of any alteration of the wording of a bye-law, except the Council give their consent to Mr. Dollar to alter the wording. This resolution must stand or fall unless Mr. Dollar consents to accept certain alterations in the wording.

The PRESIDENT: I do not see it quite in that light, Mr. Trigger. Anything

that I may deem to be an amendment must be taken by this meeting to be an amendment.

Mr. TRIGGER: Very well, sir, I will bow to your ruling.

The PRESIDENT: That is the ruling of the chair, I should say, on every occasion. Of course, I might make a mistake as to what is an amendment, but if I consider anything to be in the way of an amendment, then it must be received by the meeting.

Mr. BARRETT: Might I say I am delighted to hear you give that ruling, sir, because last year, when this very question cropped up, our learned ex-president ruled just the contrary, and he held that I was not permitted to suggest any amendment with the view to an alteration of a bye-law on the paper. I certainly dissented very strongly from this view, but I acquiesced and bowed to his ruling.

Mr. TRIGGER: I am very pleased to hear it.

The PRESIDENT: Except Mr. Dollar's resolution, there is nothing before the meeting that I know of.

Mr. BARRETT: In regard to the motion which is before the meeting, I am sorry I cannot support Mr. Dollar, and I regret, in view of the amicable words used amongst us, that he has not seen his way to modify his motion. I do not think the time has arrived in the veterinary profession when we are justified in adopting the course he advocates. There are many cases, I think, which would work very hardly upon those who are in the unfortunate position of having their names removed from the Register. The time seems to me to be coming, gentlemen, when the question will be acute as to the exhibition of boards by those who possess forges and those who do not possess them, and to hold that a committee of this Council should have the power to say that a certain man shall not exhibit boards on premises he neither owns nor keeps, whereas a man may exhibit a dozen on his own premises, is, to my mind, wide of the mark.

Mr. DOLLAR: What has that to do with the case?

Mr. BARRETT: I think we should act wisely if we adopted the motion which Professor McFadyean has suggested, and therefore I shall support him.

Mr. SIMPSON: It is well that we should be unanimous on this matter if we can. Does Mr. Dollar see his way to accept this—that the details to be published should be only these: the name, the offence, and the punishment?

Mr. DOLLAR: Yes. I feel inclined to accept that after the expression of feeling from the Council.

Mr. SIMPSON: Then I will support you.

Mr. DOLLAR: I hope this will meet the objections of the members: "That in the case of each and every person summoned on the Registration Committee of the Royal College of Veterinary Surgeons to defend a charge of 'conduct disgraceful to him in a professional respect' who shall enter a defence, a full report of the charge and of the defence, whether delivered in writing or by word of mouth, shall be kept by the secretary of the Royal College of Veterinary Surgeons, and that in the event of the Council of the Royal College of Veterinary Surgeons directing the name of such person to be removed from the register, intimation of the facts, namely the name, offence, and punishment, shall be forwarded to the professional journals for publication not more than three nor less than two months after the date of such direction, except in the event of the said person waiving his right to appeal to the Privy Council, when the intimation shall be sent on receipt of notice from him to that effect."

Mr. HARTLEY: I beg to second that.

Mr. MULVEY: Before you put that to the vote I should like to ask you what would be the effect of this alteration. It would be, when passed, a bye-law, I presume?

The PRESIDENT: Yes.

Mr. MULVEY: The resolution now proposed is materially altered, and I contend it will be necessary to suspend it for three months.

Mr. DOLLAR: I would suggest to you, sir, that it is not in any essential way altered.

The PRESIDENT: I will put it to the meeting if the meeting accepts the alteration.

Agreed to.

On the motion being put it was carried unanimously.

Mr. DOLLAR: In that case my alternative motion falls to the ground. I have now to move the next motion which stands in my name. "That no member of the Registration Committee or of the Council, who shall have made complaint to the said committee or Council, of a Member or Fellow of the Royal College of Veterinary Surgeons having been guilty of conduct disgraceful to him in a professional respect, shall vote on the motion to remove from the Register the name of such Member or Fellow, or to inflict other penalty." This motion, sir, merely crystallises into words the good sense and good feeling of this Council. It is simply an intimation from the Council as a whole of the right feeling which, I believe, has in the past always characterised the members of the Registration Committee. I believe it is a fact, and I do not think any member here will contradict me, when I say that whenever a member of the Registration Committee has found himself connected directly or indirectly with any case which has come before the committee for adjudication, he has invariably withdrawn from the deliberations of the Council. I, therefore, think that we should be doing a very proper and very worthy thing in putting it in words, and placing it in such a form that it may go forth to the world what is the feeling of the Council which actuates every member of it. I feel sure that in bringing forward this motion I shall have the hearty concurrence of everyone here, and, therefore, I beg to propose it.

MR. TRIGGER: I have much pleasure in seconding this motion, and I am glad that the fact should go forth that no gentlemen has ever adjudicated where he has been directly or indirectly connected with a case.

Mr. MULVEY: After the statement that has been made by Mr. Dollar I shall have great pleasure in supporting the motion. I can thoroughly endorse every word he has said. The members of the Registration Committee have been most particular not to take any part in any case in which they have been at all interested.

Professor EDGAR: I should like to point out a disadvantage in this resolution, namely, that it forces upon this committee the necessity of asking the gentleman to retire, and it at once places the committee in possession of information of which they were perfectly ignorant, because it puts forth that a certain individual, whoever he may be, is a public informer.

Mr. TRIGGER: I rise to a point of order. The complaint lies upon the table with the name of the complainer upon it for every one of the committee to see if he chooses.

Mr. ABSON: The name of the informer is published on the paper.

Professor MCFADYEAN: I should like to ask whether this resolution is not *ultra vires*. Supposing I am a member of the Registration Committee and refuse to leave the room, what then?

The PRESIDENT: You disobey the bye-laws.

Professor MCFADYEAN: I am not at all opposed to the resolution, but it struck me there is no power to enforce it.

Mr. SIMPSON: May I point out that Professor McFadyean has not quite read it correctly. It says that no member shall vote.

Professor MCFADYEAN: I want to know whether you can deprive him of voting.

Mr. DOLLAR: I think we can. These gentlemen are members of the committee; the committee are appointed by the Council; now I think that it is an essential of all the legal abilities that there shall be corresponding disabilities attached to them.

Mr. WARTNABY: Might it not cut another way? If the charge happened to be laid by a member of the committee, might not the informer as he is going downstairs be likely to meet the accused coming up?

The motion was then put from the chair and carried.

On the motion of Mr. TRIGGER, seconded by Mr. SIMPSON, a hearty vote of thanks was accorded to the President for his conduct in the chair.

Sir F. FitzWygram's Veterinary Prizes, 1897.

FIVE competitors entered for these prizes. The *Vivâ Voce* Examination took place at Newcastle-on-Tyne on July 22nd, and four candidates were selected for the Written Examination which was held in London and Edinburgh on July 24th.

The following are the marks obtained by the three successful candidates:—

1st prize, £50, A. F. Harbet, R.V.C., Lond.; *viva voce*, 2,109; written, 911. Total, 3,020.

2nd prize, £30, J. W. Brownlees-Dick, V.C., Edin.; *viva voce*, 1,970; written, 938. Total, 2,908.

3rd prize, £20, J. F. Thurston, R.V.C., Lond; *viva voce*, 1,950; written, 907. Total, 2,857.

The examiners were Veterinary-Captain J. A. Nunn and Mr. Geo. Elphick.

ARTHUR W. HILL, *Hon. Sec.*

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE quarterly meeting was held at the Hop Market Hotel, Worcester, on Tuesday afternoon, May 11th. Mr. W. S. Carless, president, occupied the chair; and there were also present: Professor Pritchard, Messrs. F. L. Gooch, Green, Pemberton, Forsyth, Over, Grasby, Burchnall, Crowhurst, Collett, Dr. Manley, Wilson, Whyte, Merrick, Gibbings, Taylor, and H. J. Dawes, hon. secretary; visitors, Messrs. Cayless, Franklin.

Apologies for non-attendance were received from Professors Penberthy, Axe, Macqueen, McFadyean, Williams, McCall, Sir H. L. Simpson, Messrs. R. C. Trigger, Proctor, Aris, Mason, Jones, Barling, Slipper, Spencer, Reynolds, Stanaway, Hodgkins, Blakeway, Crowhurst, Tailby, Hobson, Woolsten, Vet.-Capt. Marriott, Cartwright, Barling, Tinkler, Blunt, Olver, Green, Carless, Prickett, etc.

Previous to the business of the meeting, the members had lunch together by the kind invitation of the President, who went out of his way to cater admirably for the creature comforts of his guests. At the conclusion of the repast, Dr. Manley briefly proposed the health of Mr. Carless, and thanked that gentleman, in the name of those present, for his hospitality.

Mr. CARLESS, in replying, said the obligation was all on his side, and his only regret was that it had not been convenient for a greater number of members to be present.

Nominations and Elections.

The minutes of the previous meeting were confirmed by the meeting, and duly signed by the President, and

The PRESIDENT nominated, as a member of the Association, Mr. Edward Franklin, of Worcester. The name will be submitted at the next meeting for election.

The PRESIDENT proposed, and Mr. H. J. DAWES (hon. secretary) seconded the election of Mr. W. A. Stanaway, 55, Merridale Road, Wolverhampton. This was carried.

A similar proposition was also carried, on the motion of the PRESIDENT, seconded by Mr. COLLETT, securing the election of Mr. C. J. Byner, of Birmingham.

The Use of the Instruments.

The HON. SECRETARY (Mr. H. J. Dawes) moved "That a new rule be drawn up prohibiting members borrowing the instruments of the Association for a longer period than seven days." He had received numerous complaints from members who had been unable to obtain certain instruments, simply because other members had not returned them when borrowing them. In fact since he had given notice of the present motion, one member had borrowed an instrument and kept it two months.

Mr. GREEN seconded, but thought an exception might be made in the case of Smith's expanding shoe, as seven days was hardly long enough to see whether an animal had derived any benefit from the shoe.

Mr. GIBBINGS: Why not make the limit 14 days? That would allow for everything.

The HON. SECRETARY: I have no objection to the time being extended to 14 days. All I want is a limit of some kind, so that I know what I am doing.

The motion was then altered, by consent, so that the limit was 14 days, nstead of 7, and it was carried unanimously.

The Election of Council.

The HON. SECRETARY read letters from the Eastern Counties and the Lancashire Veterinary Medical Associations, in reference to the forthcoming election. In the case of Lancashire, there was a request that inasmuch as the Midland Association had no candidate of their own the two should issue a joint circular in the interests of the candidate whom the Lancashire was bringing forward.

The PRESIDENT suggested that the letters lie on the table.

Mr. GREEN said he could not see his way to agree with that suggestion. If this Association do not intend running a candidate of their own, they could not do better than help a neighbouring association, as the time might come when they would want help themselves.

Mr. COLLETT agreed with Mr. Green.

The HON. SECRETARY pointed out that to join in the issue of a joint circular would involve them in a share of the expense. Was this Association prepared for this?

Mr. GREEN said that as the expense would be comparatively small, he begged to move a resolution to the effect that this Association joined in the issue of a circular.

Mr. GIBBINGS seconded.

Professor PRITCHARD: I don't think this Association will be asked to contribute towards the cost, as they will be deriving no benefit from the circular

The HON. SECRETARY: I think they will. Such a thing is customary.

Eventually, on a vote being taken, Mr. Green's resolution was carried.

PRESIDENTIAL ADDRESS.

BY MR. W. S. CARLESS.

Gentlemen,—I thank you most sincerely for the honour you have done me in electing me your president for the ensuing year, the more so because my family have been so long connected with your society. I find that in the

sixties my grandfather was the president, and in 1883 my uncle, and I feel proud that you should have unanimously elected me this most important year of Her Majesty's reign, and I hope it will be an important year for our profession—that something will be done to commemorate the Diamond Jubilee of Her Majesty that will benefit our profession as a whole. I should like to see formed a veterinary benevolent society, which would help the wives and children of those members who, from accident or other causes, are not able to provide for them. There may not be many cases, but I know there are a few, and some are hard ones, and I do think a society formed on the lines of the Masonic charities would work.

I can assure you that I shall do all in my power to make this year a success for our society. I hope we shall have good papers read, that we shall have good attendances, and good discussions. I have been sorry to see of late so few of the old members present. No one knows better than myself how, let our intention be ever so good, something is sure to turn up on the day of meeting which, if we neglect, we shall spoil the day-book for that day; but when we think we only have four meetings a year, I do maintain that, with a little extra exertion on our part, we could manage to do the work of the meetings. We are pleased to see the young members, but we also want the old practical members to join in the discussions and to give weight to our meetings, and I hope that during my year of office I shall see more old faces around me.

I believe it is customary on these occasions to touch on the politics of our profession, but we are so well represented on the Council that I will not waste your time, but I do say that our present Council is one of the best representative ones we have ever had, quite different to what it was when I joined the profession nineteen years ago, though we hear that they do not now always do right; that they pass bye-laws at one meeting and try to rescind them at the next. If this is so, I think it shows that when they find they have made a mistake they have the courage to try and put it right.

Thanks to my friend, Professor Pritchard, who I know has come amongst us at great inconvenience, I shall not, gentlemen, detain you longer, and I hope that at the end of my year of office, with the help of my officers, you will not regret in electing me your president.

The HON. SECRETARY said he begged to move a vote of thanks to the President for his address, and coupled with it a request that it may be printed and published for the benefit of absent members.

This was seconded by Mr. CROWHURST and unanimously carried.

"SOME HORNS."

BY PROFESSOR PRITCHARD.

Professor PRITCHARD said:—On a recent occasion, in addressing a meeting of this description, or rather afterwards, I was twitted that I had not brought anything forward that was new. Well now, I can assure you that I am not going to attempt to do so this afternoon. My experience is that when anything particularly new is brought forward, a great deal of skill is required to make people believe that it is absolutely true. Therefore, I shall only attempt to remind you of some little things in connection with horns; and I hope that, in the few remarks I have to make to you, I shall say something or other which will give rise to a discussion. I have already had one at the luncheon table, and I think I shall be sufficiently annoying to create another in this room. I may tell you, in opening, that I do not intend to detain you very long. I believe long speeches are like long sermons: they should have a great deal of backbone in them to make them interesting.

To begin with, the surface of the body is covered with a material which is spoken of under the term epidermis; and, under certain conditions, this epidermis becomes so condensed as to produce what we call horn, in some form or other. In the human being, even, we have nails on our fingers and toes; and we have those little interesting appendages of the body, as age creeps on, which we call corns. And if we go to the other animals, animals of any size, we shall find something of this kind. All the feline tribe and the canine tribe have claws; the sheep, the cow, the goat, and other animals have horns, and even the scales on fish are nothing more or less than epidermis in a condensed condition. In the larger animals we get even greater demonstration of this. Take, for example, the horse. The growth from the lower part of his foot, which we call the hoof, is nothing more or less than a condensed form of epidermis. If we examine the internal surface of the arms and hocks, we shall find horny growths; and there are horny growths in horses on other parts of their body, especially in coarse-bred animals.

But passing from these animals, and turning to absolutely the subject of the paper, "Horns," I shall tell you that we find in animals generally three kinds of horns. I distinguish them in the way in which they are produced and nourished. Many of our stags grow a horn from a coronary secreting substance, which horn will grow to a considerable length, and in some cases to a considerable weight—not straight or single horns, as we are in the habit of seeing on the heads of cattle and sheep, but horns with a variety of branches or lines. These all grow from a coronary-secretive substance in some instances not more than an inch and a half to two inches in diameter, while some animals will grow horns from 60 lbs. to 70 lbs. weight in a year, which gives you some idea of the rapidity with which this material will grow. The horn is shed once a year. The leaf at the end of the year falls from the tree, and it is not every child that goes to the board school that can tell you why that leaf so falls. The new bud shuts off the supply of nutritive material to the old leaf, and, as a consequence of the loss of this nutrition, the old leaf falls from the branch. In a very similar way, though not exactly, the old horn falls from the heads of the animals of which I have just been speaking, and the new horn at once commences to grow. That is one kind of horn we meet with, and I may make it familiar with you by awakening in your minds the fact that we have buckhorn-handled knives made of this kind of horn.

We have another kind which receives its nutriment in another way altogether. We find that this horn is covered on its external surface by a layer of soft material, presenting not only a velvety appearance but also a velvety feeling, as vascular as the skin which covers the animal's body. That horn is a permanent one. It is seen in some reindeer, but you can't get a better example of the kind than the horn on the giraffe.

But the horn with which we have more particularly to deal is that which grows from the head of the ox, the sheep, or the goat. Here we have a horn with what is commonly called a core, the base of which is a piece of bone; the external surface of this bone is covered by a layer of vascular structure, as vascular as the sensitive laminæ on the internal surface of the horse's hoof. Take the case of the ox, it commences to form after about three or four months of fœtal life, and when the calf is born there is a distinct nodule on the head where the horn will grow from. It has simply then pushed off the epidermis. It is lined on its internal surface by a small portion of soft structure, and as it grows the epidermis becomes thickened until ultimately, in the course of three or four months, depending to a great extent upon the breed of the animal, we get a well-defined shorthorn. The growth continues for a period of three or four years, and up to which time the whole of the horny portion is in apposition with the core.

(Professor PRITCHARD here pointed out in his sketch the fact that the

inside or core of the horn was continuous with the cavities in the animal's face, and he said that the inside of the horn was as vascular as the inside of the nasal chamber). After the animal had lived five or six years, the horn grows for some little distance beyond the core, but up to the period of three or four years the whole of the internal surface of the horn is occupied by a sensitive structure, and it is one of the most sensitive structures in the ox's body. So much for the anatomical structure of the horn as we have to deal with it in the ox, and the same thing applies to the sheep and the goat.

One other matter is the indication of age, which we can obtain by the appearance of the horn, and also the indication of the sex. Take sex first: If we examine the horn of animals (I am speaking now of the bovine species) we shall find that the male has a short, ugly horn. It usually grows very large at its base and curves inwards, the points going towards the centre of the forehead. If you castrate that animal early in life, it will grow a different kind of horn, and be a much better looking one, independent of breed, smoother on its external surface and far more pointed. On the subject of age, when the animal is two or three years old, there appears a ring, and every year or two afterwards these rings multiply. If you find that an ox has, say two rings upon its horns, you may put two-and-a-half or three years on to that and fairly came to the conclusion that the animal is from four to five years old.

There are animals, which we call polled animals, grow no horns. Some years ago the Royal Society for the Prevention of Cruelty to Animals, determined to see if they could not put a stop to dishorning, and I need not tell you that I thoroughly agree with the attempt they then made. I was extremely pleased to find that although the Society got beaten in Norfolk in the first trial, the appeal which was made was won. The late Lord Chief Justice Coleridge and Mr. Justice Hawkins gave a judgment, which I should like our docking friends to look up. Their judgment was to the effect that to dismember an animal of any part of its body, unless it could be positively proved that it was for the benefit of the animal or for other reasons necessary was an act of cruelty. With regard to the dishorning of cattle, I regret that up to the present, the Society has been beaten in Scotland and Ireland. I put it to you, as scientific gentlemen, if you have listened to what I have said with reference to the manner in which the cow's horn is built up, its internal surface, possessing a core of the most vascular character—and I defy contradiction that the structure is highly sensitive, whether the operation is an exceedingly painful one. Interfering with that horn is the same to the ox as interfering with the finger nails in the human subject. Yet certain people would saw the horn off. Just try to imagine the pain which the poor animal must suffer as the teeth of the saw goes through the horn. You are also subjecting that animal to pain for months during the recovery process, if the animal ever does recover. The argument in favour of the practice is that you can put more animals in the same space by taking the horns off. I don't deny that; but are you justified on that account? It is said also that unless the animals are dishorned they will gore each other, and more pain will ensue; but all animals, whether fighting cocks or horses, or anything else, will soon find out who's master. It is their nature. If you saw the horn off an animal that is eight or ten years old, you have a chance of selling that animal as a two or three-year-old ox, for unless a man looks into the mouth of an animal, it is only by the horns that you can recognise its age.

Discussion.

Mr. GOOCH opened the discussion with a few general remarks complimentary to Professor Pritchard. As regarded the anatomical portion of the address he had nothing to say, but he was glad the question of dishorning

had been touched upon. As a Norfolk man himself he was surprised to read the report of the trial which the Professor had referred to, and especially was he surprised to see the attitude taken up by the dealers, as he thought there was so little dishorning in Norfolk. They imported a large amount of Irish cattle in Norfolk for the winter months. If the dishorning took place when the animal was young he did not think there was a great amount of cruelty attaching to it. It would certainly not be as painful as sawing off the horns of an old animal, which he considered a very cruel operation. One of the principal reasons urged against it was that it facilitated deception, but he thought the chief thing was that polled animals fetched better prices. He agreed also with the professor that animals without horns occupied less space. If it is an old animal it could not be dishorned without some trace being left of the operation, but if it was a young animal, and the operation was done properly, it would be hard to tell whether or not it was born polled.

Mr. GREEN said he had listened with great interest to Professor Pritchard's address, for it had done much towards rubbing up his knowledge of horns which he acquired in his student days. It was also useful to them as practitioners, because it was a well-known fact that their opinion was often asked in the case of accident as to the probable chances of recovery and of the growth of a new horn. Unless they understood the process by which a horn grew they could not give a true and honest opinion as to what was likely to take place afterwards. On the subject of dishorning he had had no experience whatever.

Mr. PEMBERTON said he had enjoyed Professor Pritchard's address thoroughly, although, like the previous speaker, he had had no experience in dishorning cattle. He agreed that it was a gross cruelty to dishorn cattle. but the cruelty was reduced to a minimum when the operation took place at an early age. With reference to docking, which the Professor just alluded to, they knew there was a difference of opinion as to whether it was cruel or not. He (Mr. Pemberton) thought the pain was very slight if the docking took place at an early age, say from three to six months, and in his practice, whenever he was asked to dock, he also gave that advice. The young animal did not feel the pain to the same extent as the old one. If docking was to be done, however, it was important that it should be done by a professional man, and then they would shut out farriers and blacksmiths, who did not understand the nature of the operation.

Mr. GIBBINGS: I don't think I have heard Professor Pritchard since I left college twenty years ago, but he has lost none of his vigour or powers of elucidation. I have enjoyed his address very much, and am only sorry I cannot add to the discussion.

Mr. MERRICK: I have never been asked to dishorn cattle in my life, and therefore I am also unable to speak on the subject. Nevertheless, I think it is a very cruel operation, and if it is to be done at all it should only be upon young animals.

Mr. OVER: I have had to remove horns when they have been growing inwards, but never otherwise. I have certainly found great sensitiveness. I should regard it as an act of great cruelty to dishorn an aged beast.

Mr. CROWHURST: I should certainly think the operation conducive to pain in an aged animal.

Mr. GRASBY: I think dishorning is a very cruel measure to adopt. I have seen cases where it has been necessary to amputate the horn for certain reasons, but dishorning, as a regular thing, I have never had any experience of.

Mr. TAYLOR said it appeared to him that the older members of the profession were entering into a tirade against something which they no doubt did themselves in their younger days. He thought the majority of the operations performed by young practitioners were distinctly cruel.

Mr. BURCHNALL: I have had no experience of dishorning, but I can quite believe it is a most cruel thing. I have noticed when a horn has been broken off at the end that the animal has been breathing through the opening and throwing out blood also. If dirt or any foreign matter got in, it would set up a state of things which would do the beast considerable harm.

Dr. MANLEY said that his patients did not require dishorning, but that fact did not detract from the merits of Professor Pritchard's address from his (the speaker's) point of view. He was extremely interested in the physiological and anatomical points of the address, particularly the description of the growth of the horn, because one had seen in human beings horns which had to be removed because of the disfigurement they gave to their owners.

Mr. WILSON said he was sorry he could not take part in the discussion, but he had had no experience in dishorning.

Mr. COLLETT said he would have liked the Professor to tell them why horns were cast in some animals and not in others. It was a common belief that the stag threw his horns away when he no longer wanted them to protect his mate and her young. In reference to the judgment of the late Lord Chief Justice and Sir Henry Hawkins, castration was an act of dismemberment which was not for the animal's benefit. How was it that that operation was not put a stop to by the Society for the Prevention of Cruelty to Animals ?

Mr. H. J. DAWES (hon. sec.): I should like to join in the chorus of thanks that has been raised in Professor Pritchard's honour, for I believe his address will be found to be instructive as well as entertaining. I have had no experience whatever in the dishorning of cattle, but reference has been made to the subject of docking, and in view of the prosecution of a member of this profession, I have taken considerable interest in the matter. I have been to the trouble of asking every member I have come in contact with his opinion as to whether docking is cruel or not, and without a single exception I think everyone has been in favour of it if done by a properly qualified veterinary surgeon. It seems strange to me that a member of the profession should be summoned for performing an operation in which practically the whole profession agree that, if properly done, it is a justifiable operation.

Mr. GOOCH, who apologised for rising a second time, said they often saw cows with brass on their horns, to prevent them goring each other. They were frequently called upon to take a portion of the horn off and screw in a brass ball. There was no doubt the operation caused a certain amount of pain while it lasted, but it prevented one animal goring another, and thus greater pain was saved in another direction.

The PRESIDENT: I am personally very much obliged to you all for coming to Worcester to-day, and particulary to Professor Pritchard for giving us such an interesting address. I have had no experience myself in dishorning cattle, but I can readily believe that it is a cruel operation. I agree, also, that if it is performed when the animal is young nothing like the same amount of pain is inflicted, and it is then also much more effectual. I have a young heifer that slipped down aad knocked a portion of her horn off, but she appeared to suffer no pain, and has gone on all right. We have seen animels that have had their horns knocked off and the part has been rubbed with tar, after which no trouble is experienced. I don't quite see how we can describe docking and dishorning as the same thing. Dishorning cattle is much more cruel than docking, and docking, when properly done, is not the cruelty we have heard so much about of late.

Professor PRITCHARD, in responding to the various speakers, said he would rather that the discussion had taken a channel in reference to horns generally, than to the subject of dishorning. He was glad to find them in agreement with him that dishorning cattle at anything like an advanced age was an act of cruelty, but taking the bud of the horn out of the calf was no more cruel

than vaccinating a child. If it was properly done little pain was created, and the horn would not, as a rule, grow again. It seemed to him, however, that to saw a horn down to the core, and then put a brass knob on it, was an act of cruelty. With regard to docking, it was rather outside the subject of his address, and there seemed almost to be an attempt to draw a statement out of him, but he declined to show his cards on the present occasion. He would tell them, however, that in his opinion docking was an act of cruelty, and if this Society, or any member of it, cared to challenge him, after the trial which was then pending had concluded, he should be very happy to take up the subject at another meeting, and endeavour to prove that the act of docking was a cruel one. It was as cruel as taking off a horse's ears, a practice which was in vogue many years ago, and which had been carried into effect in the case of the pony which his father first gave him to ride upon. One of the speakers referred to castration as an act of dismemberment which was not for the animal's benefit, and on that account asked why, according to the judgment of the late Lord Chief Justice and Sir Henry Hawkins, the practice was not put down as cruel. He (the Professor) did not repeat that judgment to them, only the pith of it, and to put it in another way, he would ask, Did the end justify the means? Whether it was due to atmospheric influences or breed, it was none the less a fact that if horses in England were not castrated it would absolutely be unsafe to be in the streets. Breathing through a broken opening in the horn was what he had seen himself.

Mr. GOOCH moved a vote of thanks to Professor Pritchard for the kindness he had shown this society in coming amongst them to address them.

This was seconded by the PRESIDENT and carried unanimously, Professor PRITCHARD briefly acknowledging the compliment.

On the motion of the HON. SECRETARY, seconded by Mr. BURCHNALL, a vote of thanks was also accorded to the President for his services in the chair.

The meeting then broke up, the members taking tea together before departing for their homes.

H. J. DAWES, *Hon. Secretary.*

WEST OF SCOTLAND VETERINARY MEDICAL SOCIETY.

AN ordinary meeting was held on June 9th, in the Religious Institute Rooms Buchanan Street, Glasgow, Dr. James McI. McCall, President, occupying the chair.

The following members and friends were present:—Messrs. McFarlane, Greenock; J. Weir, W. Anderson, J. H. Wilson, J. Brown, John McCall, and T. Muter, Glasgow; Peddie, Cathcart, and Campbell, Kircudbright; Brownlie, Coatbridge; Wyse, East Kilbride; Begg (hon. sec.); Professors Dewar and Mettam, of the Royal Veterinary College, Edinburgh; Professor Murphy, Glasgow Veterinary College, and six students.

The minutes of the previous meeting were read and confirmed. A letter of apology for absence was read from Mr. Clark, Cupar Angus.

Mr. W. ANDERSON then presented Dr. McCall (President) with the hearty congratulations of the Association for the very creditable position he obtained at the recent election of Council. At the same time he made a feeling reference to the illness of his father, Principal McCall, and expressed the hope that his recovery would soon be complete.

Dr. MCCALL suitably replied, and warmly thanked the Scotch societies for their substantial support, and stated that his father was now so well that he would be in his usual place at College in a day or two.

Letters in answer to our circular, *re* the Use of Mallein, were read from the following societies:—Royal Counties Veterinary Medical Association; Midland Counties Veterinary Association; South Durham and North Yorkshire Vete-

rinary Medical Association; Aberdeen Veterinary Association; Lancashire Veterinary Medical Association.

Principal DEWAR then made a few remarks on the Public Health (Scotland) Bill, and made special allusion to the fact that the amended Bill was now what we desired, and set the ball rolling for at our last meeting. That these amendments should become part of the Act, he urged all those present to write to their respective M.P.s as occasion required.

Mr. ANDERSON then read a short paper, introducing the subject, "Does the Os Pedis descend in Laminitis?" All his remarks were in favour of the negative side of the subject, and he brought forward some arguments which he was of opinion proved that no descent of the os pedis took place in laminitis.

Mr. CAMPBELL (Kirkcudbright): My opinions on the disease laminitis have altered little in thirty-five years. I always consider there are three forms of the disease—acute, subacute, and chronic. It is not now considered to be due to the causes we were taught years ago. I believe it will yet be found to be a septic disease, dependent on a specific organism. Think, for example, of parturient laminitis in the mare, which no one would think of treating without the use of antiseptics to the womb. This is certainly due to a specific element in the blood. Further, take that other form due to the injudicious use of aloes. I do not think it is due to irritation of bowels, but the presence of so much fluid there, and loss of exosmosis and endosmosis, and possibly we have the same organism as in septic parturient laminitis. How could Mr. Anderson say there was no alteration in the bone, when we see such a specimen as this? [Section of laminitis foot shown.] I admit that the bone certainly has a difficulty in descending. The coronary band assists in preventing it, but nobody says the bone drops at the coronet as it does at the toe. You certainly get the effusion and separation, and instead of going straight down you see that the point of the os pedis has gone backwards towards the point of the frog. Mr. Anderson must know that when the bone descends the perforans tendon is slackened, and this is the explanation of the heel coming to the ground. As for the ligaments, they are quite able to give way, and have nothing to do with it, and the lateral cartilages do not prevent the bone's descent.

Mr. JAS. WEIR (Glasgow): I agree with Mr. Anderson, and do not believe the bone descends at all, but that the hoof is pressed up. We have seen the same thing on the human finger. Mr. Campbell's explanation of why a foundered horse goes on his heel is rather far-fetched, and I have seen the same symptom with a pricked foot and with sandcrack when there was no laminitis at all. The reason a horse goes on his heel when foundered is because that part is strong and the toe is tender, and I do not believe the pedal bone descends at all.

Mr. CAMPBELL: I did not say it descended. The os pedis takes a perpendicular direction, it falls backwards till nearly perpendicular instead of oblique.

Dr. MCCALL: I had great pleasure in listening to Mr. Anderson's paper, but I am sorry I cannot agree with him. There certainly is an alteration in the position of the bone. I have here a fresh section of the healthy foot, and if you will compare the position and lines of the bones in this with that of the bones in this other diseased section [also produced], you will readily see that in laminitis the exudate interferes with the position, causes separation, and the point of the os pedis is pressed down, which is my contention. It is difficult to get over these specimens.

Mr. ANDERSON: I am glad to hear that Mr. Campbell is going to revolutionise both anatomy and pathology, but I must say I am not yet convinced that the bone descends.

Purpura Hæmorrhagica.

BY MR. WEIR.

Dr. McCall: This disease used to be very fatal in Glasgow, and in certain stables nearly every case died. The prevailing treatment then was the administration of iron, turpentine, and chlorate of potash. We have now, however, adopted the use of intertracheal injections of iodine, and find it gives marked relief, and the consequence is that we do not now look on purpura as such a deadly disease. I have had eleven or twelve recoveries out of sixteen.

Mr. Begg (East Kilbride).—I think it would be well for us if we knew exactly the diseased condition we were treating before we laid down any definite *rôle* of treatment. Being in country practice I have only had four cases in nine years, and though all of them recovered, two with the old treatment and two with the newer iodine treatment, probably to the better hygienic surroundings of the country as compared with town stables is to be attributed my success. However, I must say that in the cases treated with intertracheal injections of iodine the relief was more rapid, the swellings disappeared very quickly in four or five days, and did not return with the persistency that I had experienced with the old treatment. I am inclined to consider iodine the specific in treating purpura, till we understand more clearly the pathology of the disease.

Mr. Brown (Glasgow Veterinary College): My experience has not been very varied, but I have seen purpura treated by both methods, and I have been favourably impressed with the superiority of the iodine treatment. I believe the results of treatment in town and country are much influenced by the hygienic surroundings. I have no remarks to offer on laminitis.

Professor Mettam (Edinburgh): I have not seen much practice lately, but I believe the iodine treatment (*i.e.*, Lugol's solution) has been highly successful. They swear by it on the Continent, and it is to them that we owe it. We are all in the dark as to the ætiology of purpura. I often wonder, and would like to find out, whether there is any connection between certain diseases, such as lymphangitis, azoturia, and purpura; but when one begins to put hypothetical questions on the matter, we feel that we can only give problematical answers. He then made some remarks on the change in the blood and the nature of the exudate in purpura. Speaking of Mr. Anderson's paper he said: I have no opinion to offer at all about Mr. Anderson's anatomy and physiology, or Mr. Campbell's pathology. No one has defined what descent is. It means to occupy a lower level, and there is no possible doubt but the os pedis does that in laminitis, Compare the oblique position of the bones in health with their perpendicular position in disease. No doubt the horn gives way to a certain extent, but the bone is certainly pushed back. All the white face of the hoof wall is formed by the epithelial cells covering the laminæ. The bastard horn got in laminitis is all manufactured by these epithelial cells, and it is it which pushes back and displaces the pedal bone.

Professor Dewar (Edinburgh): I have no remarks to make on descent of the os pedis; but with regard to the ætiology of purpura, I think it is just as likely as laminitis to be due to some specific cause, and I may say that in my lectures I include it among the specific diseases. It is as contagious as twenty years ago black quarter was believed to be, and no one now doubts that it is contagious. I was disappointed that Mr. Weir did not mention the iodine treatment, but it has been plentifully referred to since. We have simply stumbled upon this agent, but there is no reason why we should cast it out, though we are not sure of the pathology of the disease.

Dr. McCall: I am not prepared to say that purpura is contagious. The fifteen or sixteen cases I mentioned were spread over many stables, and I never but once saw two cases in the same stable at the same time. My other

reason for believing it to be non-contagious is when we consider such a case as this. Sixty horses in one stable take influenza, and when they are getting over it one takes purpura, and none of the others. Now, if purpura were specific or contagious, you would expect more than one case when the animals are placed under such similar conditions. It is a difficult matter to say whether the change is in the blood or the capillaries.

Professor DEWAR: There is one point I would like to draw attention to, but I do not press it. You will all have noticed the foul smell that proceeds from the raw surfaces in purpura. Well, ten years ago, I observed that when we had tetanus resulting from a dirty wound, the wound had a special musty odour which I believed was due to a specific bacilus the cause of tetanus, and now tetanus is proved to be a specific disease.

Mr. ANDERSON, in reply, said: I thank you all for your courtesy to my paper. I am not convinced that I am wrong. I never disputed the lower position of the bone after the attack, but I say its attachments are not lost.

Mr. WEIR, in reply, said: I have been doing very well with the old treatment of purpura, and when that is so I do not readily change, but I hope to give the newer iodine treatment a trial soon.

New Members:—John McCall, Veterinary College, Glasgow. Proposed by Mr. Begg, seconded by Mr. Brown. Professor Mettam, Royal (Dick) Veterinary College, Edinburgh. Proposed by Dr. McCall, seconded by Mr. Anderson.

The PRESIDENT then asked that some one would volunteer a paper for our next meeting, and at the same time asked Professor Mettam if he could oblige us.

Professor METTAM: I do not think any paper I would give would be of universal interest, but I will promise you a paper if you delay the meeting till the week before or after the College opens.

Votes of thanks were then accorded to Messrs. Anderson and Weir and the Chairman.

BORDER COUNTIES VETERINARY MEDICAL ASSOCIATION.

A Record Jubilee Day for the Association.

THE summer meeting was held on Friday, July 16th, at the Old England Hotel, Bowness-on-Windermere, by invitation of the president, Mr. F. Garnett. There was an attendance of about a score members, including Messrs. B. Rutherford, Edinburgh; F. Smith, A.V.D., J. Anderson, Hexham; C. Ward, Lancaster; J. Carter, Burnley; J. Hewson and W. McKie, Carlisle; J. Armstrong, Penrith; W. C. Croudace, Haltwhistle; J. Martin, Appleby; W. Hunting, London; J. Kendal, Barrow: W. H. Nicol, Kendal. Visitors: Messrs. J. Erskine, Newcastle-on-Tyne; S. Wilkinson, Brighton; and the hon. sec. and treasurer, H. Thompson, Aspatria.

Letters of apology had been received from a number of gentlemen, including Professors Williams, McCall, Macqueen, Messrs. J. F. Simpson, H. Olver, Trigger, Locke, Faulkner, Lawson, Carlisle, Howe, Morgan, Welsby, and several others.

The PRESIDENT said that owing to the absence of Mr. J. Armstrong, Penrith, their late president, at the last meeting, the vote of thanks for his services in the chair was left over to the present meeting. Mr. Armstrong had been one of the mainstays of the society, and he had great pleasure in moving the thanks of the meeting to him.

Mr. HEWSON seconded the motion, which was agreed to with applause.

Mr. ARMSTRONG, who expressed his thanks, observed that he had tried to do his best for the society, both during his nine years of office as secretary, and also when he was president.

On the motion of Mr. H. Thompson, Mr. Fred Thompson, Morecambe, was nominated a member of the Association.

The Carriage of Horses by Railway.

Mr. ARMSTRONG brought before the meeting the desirability of better attention being given to the conditions under which horses were conveyed from place to place by rail. Horse-boxes received scarcely any attention at all from a sanitary point of view, whereas cattle trucks were kept white-washed and properly disinfected. The railway companies, he thought, should be appealed to for a little better attention to the conveyance of valuable horses by rail. For instance, an animal worth, say 15s., could have a properly cleansed truck, whereas a horse worth £1,000 had to be put into a truck which had been occupied by others, and was not cleansed. This had been proved from time to time, and it was quite time some action was taken in the matter. Small deputations from each society might wait upon the railway managers. If the authorities only paid as much attention to horse-boxes as they did to cattle trucks veterinaries would not have so much trouble as they had. He moved that a small deputation from the Society, including the president and secretary, join with deputations from other societies, and petition the railway companies to that effect.

Mr. CROUDACE said it would be best to take no notice of the matter. It was simply cutting their own throats.

Mr. WARD seconded Mr. Armstrong's motion.

Mr. R. RUTHERFORD said he had considerable sympathy with Mr. Croudace, because there could be no doubt that the general tendency of preventive medicine had been to lower the income of the veterinarian. But if they were to keep their place as a profession they must show the world that they were in advance, and, at any rate, aware of the causes of some of the most troublesome diseases. He had charge of considerable stables, and had been satisfied for years that a prolific source of contagious disease affecting the air passages of the horse were contracted in railway carriages. No doubt railway companies would meet anything they had to say on that point by saying that they could carry their horses as some people carried their cattle, and he had recommended clients to put their horses into open cattle trucks rather than in closed horse-boxes. If you gave them plenty of rope room it was astonishing how well they kept their feet. Whether anything could be made of Mr. Armstrong's motion he could not say. It would involve tremendous alteration and expense to the railway shareholders. At any rate, it would show that the profession was alive to possible sources of mischief in carrying animals.

The PRESIDENT said this was one of the things they should certainly take action against. If it came about that they obtained increased efficiency in railway accommodation, it would be something to their credit. It was right that they should be at the forefront in sanitary matters, and he was certain that travelling in closed-up horse-boxes in very hot weather was very detrimental. He would like the proposal to take a more concrete form, and he would suggest three proposals. One was that the cubic space per horse-box be increased, another that the ventilation be improved, and, thirdly, that each box be thoroughly cleansed after being occupied.

Mr. ARMSTRONG and Mr. WARD agreed to the motion being put in this form.

Mr. R. RUTHERFORD: Do you agree with me that to carry horses in these boxes in this weather is a species of cruelty?

Mr. ARMSTRONG: I won't go quite that far.

The PRESIDENT said it would be well to bring the subject before the National Society before approaching the higher authorities, and get a general expression of opinion from the veterinary profession.

This was agreed to.

The New Alterative.

Mr. THOMPSON exhibited a sample of a new patent alterative medicine, a combination of salt and sulphur in solid roll form, made by Mr. Macdougall, of sheep-dip fame. It could be given to animals in the trough in the open field. Horses, cattle, and sheep, as far as he had tried, all seemed to like it, and thought it would be of great value as a preventive of parasitic diseases in sheep and lambs, and young cattle when depasturing on low-lying and undrained lands.

Tapeworms in Lambs.

Mr. ANDERSON said he would like the opinion of the meeting about a disease which he discovered prevalent in the lambs of his district. They were troubled with tapeworm, and he had reason to believe that hundreds of lambs died every year, and farmers had no suspicion what they had died of. A farmer told him about having some lambs purged and he sent them to the butchers. In one of these, on making a *post-mortem*, he (Mr. Anderson) found two tapeworms in the small intestines about a yard long. The intestines were entirely empty of food. Some veterinary surgeons recommended turpentine, and on one farm it killed half the lambs. He tried an infusion of areca nut, and was very successful with it—an enormovs quantity of tapeworms having come away. He noticed in some cases in these lambs there seemed to be tubercular deposits about the intestines, some as large as a pea.

Mr. THOMPSON said he had not seen any tapeworm in sheep. Mr. Anderson should have sent the internal organs to some of the veterinary colleges and have got to the foundation of it, and if it was truly parasitic and not tubercular, dressing the land with salt would have good effect.

Mr. ANDERSON also mentioned cases of blood rot in sheep. It seemed to affect the fattest sheep, and in one case, where twenty-five black-faced ewes died, he found there was no blood in them at all. He suggested that the farmers should try porter and tonics. He had eight cases of recovery under that treatment.

Sudden Death of a Mare..

Mr. THOMPSON recorded a curious case of sudden death in a four-year-old cart mare. She fed very well, but lost flesh. Temperature 105 and pulse 60. The only visible symptom was a peculiar way of putting her hind legs under her body and crouching, but no sign of pain. The bowels were normal. He gave her bicarbonate and bromide of potash. On Monday last, ten days after he first saw her, she commenced to be very bad, and died within an hour. On *post-mortem*, in the mesentery there were three large abscesses, one of which had burst, and the other two just ready for bursting.

SOME FOOT LAMENESSES.

BY WILLIAM HUNTING, F.R.C.V.S., LONDON.

When veterinary practitioners meet together there is always one subject which is never too stale for discussion. Foot-lameness presents such infinite variety and is of such practical interest that it never fails to draw something from the stores of unrecorded experience. All that is wanted to make the meeting instructive and interesting is a lively exchange of opinions and a free statement of observations.

My pleasant duty to-day is merely to arrange the order of things and to lay down the lines upon which we may travel. The title, "Some Foot Lamenesses" is chosen with a view to limit the discussion, for it would require not a paper but a volume to review the whole subject.

I propose to confine myself to three conditions—fractures within the hoof, suppurations within the hoof, and to what I call for want of a better name, pseudo-navicular disease.

Fractures.—Examination of the heaps of equine phalanges to be found at some large horse-slaughterer's yards shows that firmly united fractures of bones within the hoof are more common that is generally thought. As practitioners we meet occasionally with cases of lameness which we diagnose as fracture of some of the bones of the foot, and our diagnosis is verified by a *post-mortem* examination.

We also meet with cases of lameness which quite baffle diagnosis; some, however, we feel confident are in the foot although we can only guess their nature and exact position. I want to ask this meeting how many of these are due to fracture of bones within the hoof. The question is not an unpractical one, because the more clearly we can diagnose our cases, the more certainly and positively can we form a prognosis and advise our clients to kill an incurable case, or prolong the treatment for months with a fair hope of recovery. I trust I have not led you to anticipate the disclosure of some special and novel method of forming a correct diagnosis. I have none. My object is to contribute a little unsatisfactory experience and to induce you to supplement it by your observation.

The bones within the hoof are the coronary, the pedal and the navicular. Fractures of these cannot be detected by manipulation as can similar accidents to other bones of the limbs. Nor can we base a diagnosis solely on negative signs, for there are small fractures of the large pastern bone causing very similar symptoms. These I do not intend to discuss now, but I may say that my friend Mr. William Shaw, of London, has demonstrated how frequent are slight fractures of the pastern bone which show no definite signs of their existence during life except lameness.

Some years ago I met with a case of acute lameness in the near fore limb of a cab horse. No enlargement and no heat could be detected anywhere. No pain was evinced either by pressure on parts or by flexion of joints. I diagnosed fracture of a bone within the hoof, and advised neurotomy. The operation was performed but the lameness remained, although no reaction to the prick of a pin in the heel or coronet was given. A run at grass for a month did no good, and the horse was killed. A *post-mortem* examination revealed a small chip fracture of the upper articular edge of the large pastern bone. The fractured portion was very slightly displaced, and although some bony union had taken place no exostosis on the surface or edges of the bone existed. The case showed an error of diagnosis, and also that division of the metacarpal nerves just above the fetlock joint did not deprive the head of the os suffraginis of sensibility. The position of this fracture was amenable to manipulation, but I found no signs of its existence, and I have only the satisfaction of knowing that two other practitioners equally failed.

The small pastern bone is not so often fractured as the large, but its position affords even less opportunity for direct diagnosis by manipulation. The coronary bone is almost buried in the hoof, but it may be split longitudinally or transversely, or even broken into fragments. Extensive fractures do afford some indications, even cripitation may attend a badly-splintered bone, and in most cases some swelling in the heel or round the coronet is detectable after the injury. Slighter fractures are accompanied by very little local change, and we trust to the absence of any injury to other parts of the limb, to the history of the case which may disclose direct injury, to the great amount

of pain and its sudden access, to the flexed position of the foot, and the refusal of the horse to put weight upon the leg. These symptoms point equally to fracture of any bones within the hoof, and I know no means of differentiating between fracture of the pedal or navicular bones and of fracture of the os coronæ.

I remember being called to see a black cob that had been treated for spavin by fomentations, bandaging, and blisters for some weeks. I could detect no change in hock, and the lameness seemed too acute, after so long a rest, for hock lameness without any enlargement. I suggested fracture of a bone in the foot, and the operation of neurotomy as a means of diagnosis. The nerves were divided, but nothing removed from them. The cob was sent home, with a message that the lameness was due to a fractured bone in the foot, and that it had better be slaughtered. Fourteen days later I received a message to call and see the cob, as it had gone lame again. I went, and found it, as before, with the foot raised from the 'ground and repeatedly lifted, as though great pain existed at the extremity of the limb. To my remark that I expected the cob would have been killed, the owner said, "He came home from your place so sound, I put him to work that night, and he continued at daily work till a couple of days since, when he went a little lame and rapidly got worse." The cob was killed, and a *post-mortem* examination revealed a fracture of the lower end of the os coronæ as well as a fracture of the pyramidal process of the os pedis. It was remarkable that no attempt at union of these fractures was visible, and no displacement had occurred. I have often regretted that I did not again divide the nerves and remove a portion, so as to observe the effect of a continuance at work. Of course, one would expect that working a horse with a fractured bone in the foot, after unnerving him, would soon lead to changes which would render him useless. But I am not so sure of this. Within the hoof no displacement occurs and the reparative process seems slow. When all pain is removed it is not unlikely that union might occurr and the animal work for a useful period.

Fractures of the pedal bone occur from direct external violence, as when the foot is run over by the wheel of a heavy vehicle. They are sometimes caused by nails passing through the sole, and they have been known to follow apparently very slight injuries. I remember one case where the lameness followed immediately upon the foot being let fall by a farrier. The horse was a heavy draught animal, and the toe came sharply down on the stone flags of the shop floor. The bone was split longitudinally into two pieces.

Another case I saw in a heavy horse which had a bad cankered foot. The sole was entirely removed by disease and treatment. The horse was apparently improving, and was taken to the forge to be re-shod. Next day the lameness on the diseased limb was much intensified, and it was thought that the farrier had blundered with some of the nails. I carefully examined the foot and leg, but could find nothing to account for the lameness. I remarked that if it were not a cankered foot I should have expected a fractured bone. The lameness increased, and the horse was killed, when a complete longitudinal fracture of the pedal bone was discovered. How it occurred is not at all evident. The farriers noticed nothing unusual during shoeing. The shoe was properly fitted, and I can only surmise that the absence of a horny sole permitted the fracture by weight transmitted through the bone above.

The pedal bone may be fractured in the same way as the pasterne—by concussion during a fast pace. It would seem as though a false step were necessary to produce the injury, and that weight be thrown upon the bones when from some want of co-ordinate movement they were not in their normal relative positions. So long as the phalanges retain their sloping position to the cannon a misstep would probably affect the tendons and ligaments, but if weight were thrown on the foot when the phalanges were straight, then direct

concussion would occur, and fracture result. It is quite possible, too, that the lower segment of the bony limb might be predisposed to concussion by a disproportionate state of the foot, especially by having the heels left too high, or it might be by the position of the foot produced by high calkins.

Fracture of the navicular bone is not uncommon in old cases of navicular disease, especially in those which have been submitted to neurotomy. It occurs in horses free from that disease, aud I have found on *post-mortem* examination a number of navicular bones showing firmly united fractures. I cannot distinguish this injury from some cases of navicular disease. Both may commence suddenly, and be accompanied by an equally intense lameness. Swelling in the heel may be equally wanting in both.

Fractures of bones within the hoof cannot, I fear, be diagnosed with much certainty. We can only judge from the amount and suddenness of the lameness and from the absence of any lesion in other parts of the limb. To differentiate between fractures of the three bones is impossible, but this is not practically important, for the same treatment would be applicable to all. We may advise slaughter, or a long rest, or neurotomy. The intensity of the lameness and the value of the animal would guide us as to which we recommend.

Suppuration within the hoof. If I were asked what were the three greatest causes of loss of service and loss of life amongst horses I should say lung diseases, bowel complaints, and suppurations within the hoof. We may well, then, devote special attention to these "foot cases." Even when not fatal they entail such a prolonged period of rest, they cause such trouble and anxiety, that a right understanding of their nature and treatment is of the highest importance.

The anatomical conditions of the foot are the chief factors which make suppuration in the organ such a grave event. There is an outside envelope of horn, through which the practitioner cannot easily follow the changes caused by inflammation. There is the pedal joint which is very liable to be attacked with purulent inflammation, and there is the sheath of the perforans tendon, which may be invaded by suppuration. Either of these accidents is sufficient to render the horse useless for life. For surgical consideration the foot may be divided into two portions—anterior and posterior.

The front portion is characterised by an envelope of hard, thick horn, and by a central mass of bone. Between the two is a layer of vascular and sensitive tissue, which, when inflamed, has no room to yield to the consequent effusion, and is soon destroyed by the excessive pressure, whilst the most intense pain accompanies the morbid changes.

The back portion of the foot has an envelope of more yielding horn, and the central part is a soft and loose mass of fibrous material bounded laterally by the wings of the pedal bone and the lateral cartilages. Here suppuration is not so confined and not so painful, but unfortunately its spread may do great mischief by injuring important tissues, such as the sheath of the perforans tendons, or the lateral cartilages which heal so slowly when once the seat of ulceration.

Slight injuries, followed by suppuration, may run a short and simple course in either the front or back portions of the foot. Serious injuries in the front are usually violently acute and often fatal. Serious injuries in the back usually give rise to chronic lesions which are difficult to cure, and to often incurable, but they are seldom fatal except when septic inflammation extends above the coronet.

The causes of suppuration within the hoofs are wounds of all kinds—from nails in shoeing, punctures by picked-up nails, injury by treading on the clip, from bruises by the shoe at toe or heel, from treads, sandcracks, and other

violence penetrating the horn. All these may cause pain and effusion of fluid without being followed by suppuration. When the vascular tissues are torn, laid bare, or deeply punctured, it is seldom we escape the formation of pus.

When a foot is pricked in shoeing, or punctured by a picked-up nail or other sharp object, the horse may go lame immediately for a short time, resume work, and in a day or two be found very lame again. Or no lameness may be noticed for two or three days after the injury. It seems as though there were a period of incubation—a lapse of time during which the organism introduced into the wound was developing, and this no doubt is the case. The old farriers when they extracted a picked-up nail or withdrew a wrongly driven nail in shoeing, made a practice of applying a little butter of antimony, or some tar, to the opening through which the offending object passed. They were quite right in their practice for they thus probably prevented further infection or even stayed the progress of any which had occurred. Too little attention is paid to slight wounds of the foot. Very often a cut or a puncture does little harm at the time by the mere division of tissues, but the opening left admits pathogenic germs which set up suppuration and lead to the most serious complications.

When suppuration is caused by a puncture of the foot in its anterior half, from treading on a clip or from a nail in shoeing, pain is very great. The laminæ are enclosed between unyielding hoof and bone, and the inflammatory swelling causes such pressure as often to destroy the vascular structures throughout the whole distance from sole to coronet. The destructive process may even cause death of a portion of the coffin bone. These cases sometimes rapidly terminate in death, and often are never again fit for work. At the back part of the foot a puncture followed by suppuration seldom causes such acute symptoms, but it is very liable to give rise to chronic suppuration—to a quittor.

Suppuration within the hoof tends to find an exit at the coronet. Its escape through a separation between hair and hoof leads to swelling of the coronet, but very seldom is this escape followed by uninterrupted healing. The coronet becomes inflamed, swelling extends, the secretion of horn is interfered with, and the suppurative process may invade the pedal articulation.

When suppuration results from a bruise at the heal by a shoe—in fact from a corn—we have again the escape of matter from the coronet, after great pain. In some cases healing follows without much complication. In others the escape of pus through the separation between hoof and hair is followed by swelling of the coronet, increased pain, the formation of abscess, and finally the establishment of a quittor due to disease of the cartilage.

Treads are one of the most serious injuries producing suppuration within the hoof. Sometimes the skin over the coronet is deeply wounded, and portions of tissue destroyed. Such a wound is very liable to become infected with pus-producing germs. Sometimes a tread does not penetrate the skin, but it so bruises the tissues as to cause a deep slough, and then we have a wound favourable to the invasion of organisms. Everyone has noticed how in one case an extensive injury resulting from a tread heals kindly and rapidly; whereas in another case, which at first seemed slight, the very gravest symptoms followed. The difference is due to the infection of one wound, and to the absence of infection in the other.

The injuries which give rise to suppuration may cause much mischief by the damage to important tissues and by the lesser inflammatory changes induced. But the gravest injuries are due to suppuration produced by the entrance into wounds of pathogenic organisms. If we could avoid all such infection our foot cases would lose three-fourths of their seriousness, and the point upon which I most want to insist is—the necessity of using every antiseptic precaution in the treatment of the simplest wounds in the region of the foot.

(*To be continued*).

YORKSHIRE VETERINARY MEDICAL ASSOCIATION.

THE summer quarterly meeting was held at the Queen's Hotel, Leeds, on Friday, July 30th. In the unavoidable absence of the president (Mr. G. Whitehead, of Batley), the chair was taken by Mr. Chambers, of Kirkheaton. There was only a small attendance, which included Messrs. Clough, Morley; Snarry, York; J. E. Scriven, Tadcaster; and A. McCarmick, hon. secretary, Leeds.

Letters of regret at inability to be present were announced from Professor Williams and Professor Penberthy, also telegram from Mr. G. Whitehead, president.

The late Council Election.

A letter was read from Mr. J. H. Carter, Burnley, conveying to the members of the Association his sincere and grateful thanks for the generous support extended to him in the recent election of Council of the Royal College of Veterinary Surgeons. It was, wrote Mr. Carter, highly gratifying to know that such generous assistance received from the Yorkshire Association, along with the Midland and Eastern Counties Association, respectively, had secured him a seat on the Council by a magnificent majority, and he hoped sincerely that he would prove himself worthy of the confidence reposed in him.

New Member.

On the motion of Mr. SCRIVEN, and seconded by Mr. MCCORMACK, Mr. H. J. Parkin, of Doncaster, was elected a member.

The Treatment of Fractures.

The CHAIRMAN opened a discussion on the treatment of fracture by describing his own course of procedure. At the outset he explained that he had never used plaster of Paris, so that he did not know whether his own method was the best or not. It was the old material which his father and, he supposed, scores of old veterinary surgeons used, viz., Swedish pitch and resin, in the proportion of two of the former to one of the latter. This was melted down, care being taken that it did not boil into the fire. When it had cooled sufficiently to enable one to bear the finger in, commence to apply with iron tablespoon. In fractures of the scapula, humerus, pelvic bones, and femur he smeared the material well into the hair, as much as would stay on, and a few flocks might be stuck on before it had set. He had used this dressing in the above manner to the lumbar region in partial or total inability to rise when in recumbent posture, but could not say he had seen much benefit, though it had satisfied his client. In fractures below the elbow and stifle, after having smeared the hair well with the material, he used wood splints and bandages, and before applying a splint he wound about two thicknesses of cotton bandage over the parts to be stiffened, always smearing the material on the bandage as he unfolded on to the leg. He then dipped the pieces of thin wood into the material and stuck them on and commenced bandaging again over them. The wood should be about the thickness of cigar boxes, and he used about four pieces, according to size of the patient. For heifers and foals with fractured tibia, and where high up, he found a broad piece of wood, well rounded at its edges, and allowed to go well up into the inguinal region, to be very beneficial, but the splint then had to be held from below. First they worked plenty of material into the hair, then bandaged a thickness or two with dressing between each layer, then apply the splints and then bandage again. In some cases it was desirable to remove the dressing and reapply about two weeks after, as it always left the skin and took the hair with it and often left a vacancy. He had treated cases of compound fracture, one of tibia,

and the other of radius, one of a very thin beast, the other of a yearling cart colt. In cases of fractured radius and metacarpal and metatarsal bones the matter is very simple. He never slung in these cases. He had never attended an aged horse, but if the animal was worth a trial he should sling and have a try.

Mr. SCRIVEN said that in certain fractures he always slung.

Mr. SNARRY thought there was a better and cleaner treatment than that followed by Mr. Chambers, and that was Gooch's splints, which he had tried with the greatest success possible.

Bacterial Necrosis of the Liver.

Mr. CHAMBERS also described the symptoms of a cow which he had attended. He said he was called in to see the animal on Tuesday. She had not been quite up to the mark for a few days previously but the owner had given simple laxatives, and when he saw her she did not seem much amiss. He made it out to be slight derangement of the digestive organs, and gave her a few powders, and the owner promised to let him know if his services should be required again. On the Saturday following he received a message to call, as the cow was worse, and he found her with quick pulse, about 100, and temperature 103 2-5ths, nostrils dirty, eyes injected, head down and nose extended a little. Her bowels were open, so he gave her 15 min aconite tc. every three hours, and called again the following day (Sunday) pulse 120, and at times the beat could be heard a yard away, breathing quick and spasmodic, animal uneasy and tottering on her feet when made to rise, and soon going down again, almost like a cow going down in milk fever. He told the owner to have her dressed as she was likely to end fatally, and probably she had foreign body in her, but gave him to understand that I was not quite sure as to the real cause of the disturbance. She was killed and revealed all organs healthy except the liver, which was studded all through its substance with nodules about the size of a pigeon's egg, firm to cut and to the touch, and of a yellow colour; the liver was also greatly enlarged. He sent a portion to the New Veterinary College and it was reported as "bacterial necrosis of the liver." There was no yellowness of the skin or mucous membranes; in fact, nothing to awaken my suspicions as to the liver being the cause of the disturbance.

Proposed Alteration of Rules.

Mr. SCRIVEN gave notice that at the next meeting he should move that the summer meeting of the Society be not held. He said he was induced to give the notice by the small attendance on that occasion.

The proceedings then terminated.

LINCOLNSHIRE VETERINARY MEDICAL ASSOCIATION.

(*Continued from page* 114.)

The Halifax Docking Case.

Mr. J. MACKINDER introduced "the Halifax Docking Case and the Veterinary Mutual Defence." He said he might begin by observing that he did not wish to hurt the feelings or speak disrespectfully of any member of the profession whose ideas were different from his. As to the Halifax docking case it commenced in this way. Mr. Appleyard, of Halifax, a young practitioner, was requested by a client of his to dock a three-year-old horse. He told him to send it up to his place, and a man brought it up and he docked it. There was no fault found with the way in which it was docked. The usual docking was done and the actual cautery applied, but the horse was a little fidgety and

bled a little, so a little flour was put at the end of the dock, and was sent on its way home. A sergeant of police noticed a few drops of blood splashed on the hock of the horse, which was a chestnut. Seeing this blood, he questioned the man, who said the horse had just been docked. The policeman thought it must be cruelty, and wanted to make everyone believe that blood was running from it then, but this was not proved. He was afraid when the sergeant of police went to see Mr. Appleyard on behalf of the Society for the Prevention of Cruelty to Animals he spoke rather rash words. He told them to go and summon him if they liked. That put the Society on their mettle. There was no excuse whatever for saying that the animal suffered pain, but the Society at once took the summons. Mr. Appleyard had no idea there was going to be a case. He thought he should simply have to go as a veterinary surgeon, and say that he had docked the horse on behalf of his clients, but when he got to the court there was counsel and professors arrayed against him. By the advice of his brother veterinary surgeons he applied for an adjournment, and the magistrates told him he would have to pay the costs of the day, £20. The veterinary surgeons guaranteed the money between them, and the case was adjourned, and afterwards adjourned again at the wish of the Society. It came on on May 30th, and the Society were represented by two barristers, Mr. Ward and Mr. Colam. They specially drew attention to what was cruelty and took Mr. Justice Hawkins' definition of cruelty as set down in the dishorning case, in which he said that they had no right to inflict any pain on any animal to improve its appearance. Mr. Justice Hawkins said if dishorning would put 40s. a head on each bullock they were not justified in dishorning. He himself took it that docking was a necessity. The other side argued that docking was not a necessity but excessive cruelty. He must say that their friend Professor Pritchard had got three very nice plates showing the arteries and nerves, and displaying any amount of nerves in the tail. It was not much in the veterinary surgeon's favour to show that plate. Professors Williams and Axe, however, said that there was very little sensation at the end of the tail. This subject was brought up twelve years ago, at Manchester, when the same sort of thing was mentioned by Mr. Colam, the Secretary to the R.S.P.C.A., who tried to show to what cruelty in nicking or cropping they as veterinary surgeons resorted. He found, however, that the majority of those present were in favour of docking, and a resolution was carried that the prosecution of veterinary surgeons for docking horses' tails was a matter of sincere regret, and it was thought that the Society should be guided by the opinion of the profession. A circular was sent out at the time to every member of the profession, and the majority declared that docking was necessary. They (the Society) had ignored that opinion of the profession and were trying to set the opinion, the *ipse dixit* of Professor Pritchard and one or two more against it. They ought to be very firm on this point (the Veterinary Surgeons' Defence). Here they had a young man brought before the magistrates and fought by two counsel who might half ruin him. He would be ruined by this rich Society, and he thought they should do more for veterinary mutual defence and help one another in such matters as these. He should like to be absolutely certain that they thoroughly agreed that they should defend one another by means of some society. He suggested that a resolution should be adopted to the effect that in the opinion of this society the operation of docking is a necessity, and is not cruel if properly performed by properly qualified veterinary surgeons.

At the suggestion of the President, Mr. Mackinder agreed to defer the exact wording of his resolution until the end of the discussion.

Mr. HARTLEY said he thought the resolution, as at present worded, was far too strong to go forward as the opinion of the Lincolnshire Veterinary Medical Association, namely, that docking was not cruel, and that it was

necessary. His position personally with regard to docking was that he docked animals every week of his life, but somebody did great harm by docking young animals, especially half bred. Their market value would be very much enhanced by their being left until they were older and they knew the character of the animal and for what purpose it was wanted. He was talking to a big Suffolk horse dealer the other day and a horse was brought out with a short tail, and he (the speaker) said "what a thousand pities." The horse dealer said, "You mean his tail. If the horse had been left with his tail on, I could have made ever so much money of him." He gave that to them as the experience of a man who was a representative of the horse trade and knew of the harm done by indiscriminate docking of young animals. He did not think that anybody could say that docking was a painless operation, or an operation not cruel. He could not see what ground they could take in the matter. He had seen horses and docked them, and they had not left off feeding except for two or three minutes. He had taken the pulse and the temperature, and felt sure the animal had suffered the minimum of discomfort. There were ways in which any veterinary surgeon might make a wound, and pour a molten substance on it in the shape of resin. He only applied an antiseptic at the end of the tail, and applied actual cautery. If they cauterised the end of the tail, they formed an impervious material which prevented the absorption of any germ or any matter which was likely to cause discomfort. He certainly thought it was not cruelty if an animal were skilfully docked. He certainly recommended tight ligatures which interfered with the nervous centres and stopped the flow of blood, and if they could seize the tail and get the iron on it, in twenty seconds they could almost seal the vessels, and reduce the pain very considerably. The pain, in his opinion, was not nearly so much as voluntarily taken by men, or by ladies in tight lacing, or by tight boots, who voluntarily suffered more pain than they as veterinary surgeons inflicted on animals. Though he had a certain respect for the R.S.P.C.A., he was afraid a great many of the subscribers and members of the Society would walk along the street and pass suffering humanity without a thought, only to find some fanciful cruelty to an animal. As to the necessity of the operation, he frankly confessed he had to pander to the fashion he believed in. As to the necessity, they might take the ground that they got mud splashed on their breeches, and if the horse's tail was cut off square close up to the dock, there was a danger of getting the reins under his tail. But then, why not alter the cart and put it in such a position that the animal could not kick it? He should not like the Association to take up such a strong position as indicated by Mr. Mackinder. He had been asked to give evidence by the R.S P.C.A., and he said, "Yes, but I must reserve the right to form my own opinion on the merits of each particular case. I don't pledge myself to give professional evidence or hostile either." There was nothing to justify any veterinary surgeon in being biassed in giving evidence without reference to the facts of the case.

Mr. Howse said there was a great deal of 2s. 6d. docking about this case. The tail was taken off with the ordinary shears, there was no tight ligature. He did not think it was a very good animal to deal with, and the man had not much help. The tail was filled with blood, and some of it dropped down on the hock. Where the 2s. 6d. business came was in not having sufficient help, and in not having a proper ligature to the tail, and not to wash the blood from the hocks before it went out of the yard. He held docking was a necessary operation for harness horses and hunters. He instanced the case of Mr. Hopkins, who said he could not sell hackneys or hunters without being docked, because people preferred them. They could not drive any undocked horses as leader in a tandem or team, and there were plenty of traps in which they could not drive an undocked horse. There were plenty of traps that did

not admit of alteration, and reins over a bar acted as bearing reins. He suggested an application of cocaine until the tail ceased to recognise the application of the finger nail. It had been his practice to use styptic colloid and he found the tail became flaccid on its application. He held there was no evidence of pain when the horse would stand without a twitch being put on him. The question of cruelty he felt did not arise when the operation was properly performed.

Captain RUSSELL said he was no respecter of the S.P.C.A. He had long since given up this Society because they prosecuted veterinary surgeons for performing operations; and until they changed their tactics they would never find him appearing in any case where they wished to prosecute anyone. He did not believe in the way they went about their cases. He was inclined to think they were making a little too much fuss over this case of defending docking itself. But his impression was that what they wanted was that they, as veterinary surgeons, should have the power to perform any operations they thought necessary, without consulting the R.S.P.C.A. Providing they performed every operation with the necessary skill and without unnecessary pain, that should suffice. Either their diploma gave them the power to perform any operation or it did not. What was their diploma worth? Why did they go to college for three or four years if that diploma would not defend them against the attack of such societies when they performed any operations which they considered necessary, scientifically, and with as little pain as possible. They ought to be able to exercise their own discretion in such matters. They wanted to find out the value of this piece of paper. If it were of value why had this Society the power to prosecute them for performing an operation?

As to the necessity of docking, it had been his misfortune to own a kicking charger which, on parade, constantly knocked his helmet off with his tail when he kicked, and he did not know what he had cost him in new helmets. Again, a little kicking mare got her tail over the reins, and she bolted for five miles as hard as she could go. He took her home, docked her, and she never kicked or got her tail over the reins again. If they were to drive horses with long tails he did not know how many accidents they would be responsible for, but he did not like to hear veterinary surgeons say they docked horses for the fashion's sake. He honestly believed he did not. He docked horses because he was asked to do so, and nine times out of ten there was a reason for it, either they were going in harness or were hunters. It was an operation which, if properly performed, did not cause any excessive pain. In the last 25 years he had docked some 1,000 horses, and he could not call to mind more than three or four horses that had actually kicked during the performance of the operation. He cited one case, when a particularly vicious animal, its character not being known to him, kicked him on the chest, and knocked him down. He most sincerely hoped the profession would win in this case, not so much that he actually cared for the operation of docking, but if they allowed the Society to introduce the thin end of the wedge in the way of prosecuting for operations, they would never know how far they were going or where they were going to stop. If they prevented veterinary surgeons docking he was of opinion that there would be an increase in the number of men going about the country docking, and there would be many more horses lost. There were many diseases veterinary surgeons used to have under treatment now supervised by the police, and if they went on there would be nothing left for the professional and qualified man, in fear of the Board of Agriculture on the one hand and the Society for the Prevention of Cruelty to Animals on the other.

Mr. JAS. SMITH said sufficient stress had not been laid upon the fact that to restrict a qualified veterinary surgeon from performing an operation, was

the very last thing in the world to stamp out the complaint. As long as docking was fashionable, if qualified veterinary surgeons were not allowed to do it, horses would continue to be docked, and cruelty would exist a hundredfold more than now. There were some veterinary surgeons who were so far behind the times as to put a little resin at the end of the dock, and he thought if they were to ask the horse's opinion, he would tell them he did not know the difference. He quite agreed with Captain Russell in taking the stand that as a profession they should not be dictated to as to what operation they should perform. He hoped that as a profession they would have their right proved to dock horses. Mr. Gresswell instanced a case of a foal he was asked to dock, but before he performed the operation it was found suffering with tetanus. Had that animal died of tetanus after the operation, it would have been put down to docking. He gave an account of docking a horse with a tight ligature before two magistrates and they were so satisfied that one of them gave him the order to dock two or three of his horses, so he thought there could not have been a vast amount of pain. He agreed with Captain Russell that if they were to be dictated to by the R.S.P.C.A. the sooner the diploma was torn up the better. If the profession did not assist each other they (the Society) would get in the thin end of the wedge, and they would have very little to do.

Mr. GOOCH said a very great deal of the opposition that existed between veterinary surgeons and the Society was the way they went about these cases. They simply took evidence from a police officer, and did not take into consideration the veterinary surgeon knowing anything about the case. In one case, particularly, the police officer knew that he (the speaker) was well acquainted with the case, but he never approached him. If the officer had said one word to him the case would not have gone on, and, as it was, it was lost. Professor Pritchard had lately expressed his opinion that if they won this case, and stopped veterinary surgeons from docking, in less than a fortnight docking would not be known, and added that it was impossible to dock horses without giving pain. He thought if they looked round they would find very few magistrates with undocked horses.

The PRESIDENT said he was quite certain that the Committee of the R.S.P.C.A. did not wish any veterinary surgeons to give evidence in any case except in a conscientious manner. In reply to Captain Russell he would say that he knew many instances of men in good positions being prosecuted by the Society. Captain Russell also referred to the diploma giving veterinary surgeons power to perform any operation they thought necessary, and he himself thought these operations should be performed, but in a thoroughly scientific manner. He was inclined to think that Mr. Appleyard had handled this case in a somewhat slovenly manner but more than that he should like to say that he was totally against the Society prosecuting veterinary surgeons, and did not believe in their interference in the performing of operations in the best possible manner. Referring to Mr. Gooch's observation he said if any of these cases occurred where the police or other officer neglected to perform his duties if they would only lay the case before him, he would take care it was properly represented by the Society. As to docking, from what he had heard in this room very few veterinary surgeons could claim that there was no pain in docking. It was the fashion to dock horses, and he thought himself in certain cases it was necessary for the safety of the person who had to use them that they should be docked. Although Professor Pritchard was one of his dearest friends he had his own opinion as to docking horses, and he (the speaker) did not agree with him. He was quite sure it was a conscientious objection on the part of Professor Pritchard, that although he had appeared against veterinary

surgeons he conscientiously believed docking to be cruelty and had said so to him for the last 20 years.

Mr. MACKINDER asked how many horses did Professor Pritchard and the Society see docked in the show yards? From the Prince of Wales downwards, of the exhibitors, and yet not a single summons was issued, but here a young man just starting practice was prosecuted. He was sure the Society had made a great mistake in this case. He moved the following resolution, (which was seconded by Mr. RUDKIN and adopted by 12 votes to 2), "That in the opinion of this Society the operation of docking is generally a necessity, and that although slight pain is caused it is not cruel if properly performed by a duly qualified person."

The members then adjourned for dinner, at which the toast of the Queen, gracefully submitted by the PRESIDENT, was enthusiastically honoured.

THE CENTRAL VETERINARY MEDICAL SOCIETY.

(*Continued from page* 123.)

Means of Controlling.

The authorities which I would suggest for dealing with the questions are, first of all, a central board in London, who would have the framing of all general regulations controlling the disease, making uniformity all over the country. They would also have the compiling and comparing of statistics from various counties, and be in a position to give expert advice and assistance in any part of the country where it might be necessary.

In every county I would suggest another board or veterinary inspector in direct communication with the central authority, whose duty it would be to deal with the disease in his respective county; and in each district I would suggest local veterinary inspectors in communication with the county inspector, who would be given power to deal with the disease in their respective localities.

If you provided machinery by which the animals could be inspected, the question would arise, what animals should be inspected? I think we could safely limit them to milking cows and bulls; and then if they are inspected a provision must be made for the proper disposal of all animals that are condemned. This requirement I think could best be provided for by the establishment in every county of a public abattoir. I would then suggest that once a year, at least, all milking cows and bulls be tested with tuberculin. Those that react should be branded, and at once isolated; the stalls should be thoroughly cleaned and disinfected. These animals might be fattened and sent to the abattoir in a fit condition; they should there be valued by competent and disinterested valuers, and the owners paid their full value, the animals then to become the property either of the county or Imperial authorities. They should be slaughtered and carefully examined.

When an animal is obviously diseased and is in a poor or wasted condition and of a less value than about six pounds, no compensation should be awarded; it should be dealt with under the Animals Diseases Act as a source of public danger, and the owner made liable on default of reporting it.

The report of the last Royal Commission on the circumstances determining danger to men from meat of tuberculous animals, I think proves that a very large percentage of those animals which would react might quite safely be used for human food; and we may take it that of those animals which reacted only some three or four per cent. would be utterly condemned. These the county or Imperial authorities would have to bear the loss of; the other animals would be dressed in the ordinary way for food—special care being taken to

carefully cut out any small portion which might be tubercular, and the rest of the carcase could then be sold as second quality meat for human food, or used for Government contracts, etc. Undoubtedly this would mean a certain loss to the authority which had to buy the animals, but I believe the loss would in no way approximate to the loss which accrues to the country through the annual death or disablement of animals at the present time, independently of the large sentimental value attaching to human life.

Besides provision for the disposal of condemned animals, well considered regulations, properly and universally enforced, would have to be made for the isolation of affected animals; the disinfection of cow stalls; their proper ventilation and drainage; while the minimum air space of at least a cubic foot per pound live weight of cow, should be enforced.

Discussion.

Professor McFADYEAN: Mr. President and gentlemen, I rise with great pleasure in response to your call to open the discussion on this interesting subject. I have no doubt that the discussion is likely to prove an animated one, and if the rules of the Society admit, a protracted one, and, therefore, I must not occupy a very long time myself. I noticed that Mr. Sessions began his paper by apologetically observing that he was neither a pathologist nor a bacteriologist. Well, it struck me that the apology was unnecessary. I do not know who has said that only those who are pathologists and bacteriologists can express opinions of value as to the best methods of dealing with tuberculosis. Mr. Sessions may not be a pathologist, but he knows some pathology, and he also knows some bacteriology, and certainly he has the very important qualification for treating this subject, of having had a large amount of practical experience in dealing with tuberculosis. Therefore, I think, he was well qualified for undertaking the composition of this paper, and I also think he has acquitted himself to our entire satisfaction. In connection with a subject that ramifies in so very many directions, it is not likely that we shall all form unanimous views on every point. There are some things that Mr. Sessions gave expression to with which I do not agree, but I do agree with the greater part of what he said, and, in particular, I agree with him on the points that are of main importance. One of the points on which I do not agree with him, Mr. Sessions touched upon at the very outset of his paper. He said that the disease had not been recognised as a wide-spread one prior to the discovery of tubercle bacillus by Koch. That is assuredly not correct, and it is only right to remember that long prior to the discovery of the causal germ of tuberculosis, practitioners, on the simple ground of observation and clinical evidence, had arrived at the opinions which we hold now, that is to say, it had been recognised by many practical men before the discovery of the bacillus, that tuberculosis was a contagious disease, and measures to deal with it as such had been urged both by members of the medical and veterinary profession. I think that ought to be mentioned to the credit of practitioners who could make no claim to being bacteriologists or pathologists. With reference to the identity of the germ that is the cause of the disease in various species, Mr. Sessions, I think, assumed it as proved that the germ in each species was identical with that which is the cause of tuberculosis in others. I think nobody denies that now with reference to the tubercle prevailing in the various species of mammals. I am not quite sure, however, that this is accepted by everybody with reference to the bacillus that is the cause of tuberculosis in fowls. I am rather inclined to think, too, that tuberculosis in pigs is not often due to infection from human sources, and I do not think that the disease exhibits a great tendency to spread from pig to pig. My impression was—although I am prepared to abandon it when suffi-

cient evidence to the contrary is forthcoming—that in 90 per cent. of cases of tuberculosis in pigs the infection is not from pig to pig, but from cow to pig; and nearly all the cases of tuberculosis in pigs that have come under my observation, where evidence as to the mode of infection was really obtainable, were due to the feeding with tuberculous milk or slaughterhouse offal. I do not deny that, in certain circumstances, the disease, once started among pigs, is spread from pig to pig as in the instance mentioned by Mr. Sessions. Then with reference to the much-discussed question of the prevalence of the disease in this country, I suppose we are all prepared to admit that we have not available any evidence that justifies more than a guess as to that. We cannot pretend that we know to one or two per cent. what is the amount of tuberculosis in this country; but still we do know, as Mr. Sessions mentioned, that among the cattle slaughtered under the pleuro-pneumonia slaughter order somewhere near 20 per cent. of these animals were affected with tuberculosis. Now, it ought to be remembered in connection with that figure that the inspection to which carcases were subjected under the pleuro-pneumonia slaughter order was by no means a rigid one. It usually extended merely to a cursory examination of the principal viscera of the abdominal and thoracic cavities, and I think that, with very few exceptions, it did not include a careful examination of all the common seats of tubercle. Hence I think if that examination had been correct or searching the proportion of animals affected with tuberculosis would probably have been found to be 30 per cent. I certainly think it is probable that more than 5 per cent. of the cattle in this country over two years of age are the subject of tuberculosis. I think it is not improbable that nearly twice that percentage are tuberculous. Mr. Sessions said that the percentage at Berlin was 15, and at Copenhagen 17. I do not know whence he derives these figures. My impression is that the percentage in adult cattle is much higher at both those places. (Mr. Sessions: Those are the figures of the last Government return.) I know that in some figures about Denmark, supplied by veterinary surgeons, the percentage of tuberculosis is about 30 per cent. in adult cattle, and in many places the percentage in dairy cows is 50 or 60 per cent. The percentage among young animals in this country is, I think, small. One per cent. is probably the outside, although Mr. Sessions thinks that a considerable number of cases pass undetected in young animals. That is, no doubt, true of old animals also, but what he mentioned did not entirely convince me. He spoke of animals pining gradually, and being put out of the way.. We know that there are other diseases that lead to pining. Unless Mr. Sessions can assure us that he has *post-mortemed* a large number of young animals, and found them to be tuberculous, I am rather inclined to think that the percentage of young animals in this country is even less than one per cent. I know there are places abroad in which the percentage is greater. It has been shown to be considerably greater in Denmark, but then the conditions are not the same in Denmark as in this country. There the calves and the cows that give birth to them are for seven months of the year stalled together in the same building. There are many Danish stocks in which 50 per cent. of the cows are tuberculous. In that case I should not be surprised if one per cent. of the young animals were tuberculous. Here, in England, the practice is not the same. As a rule, the calves are kept in a separate building unless they happen to be sucking their dams, and in that case neither the calf nor its mother is so closely confined. Mr. Sessions thinks there are many breeds in this country in which the proportion of tuberculosis is small. What he said would almost lead us to infer that there are breeds in which tuberculosis hardly exists. If we exclude the mountain breeds, which are practically never kept in houses, we have very few breeds in which there is not a considerable proportion of tuberculous

cases, but I agree with him that the percentage is largest in the animals most closely confined. He might, when he replies, mention the breeds in this country which he thinks are entirely exempt. Then there is the vexed question of heredity. I thought at first that Mr. Sessions was going to adopt and defend the view that tuberculosis is very frequently present in the calf at birth, He did not; but, on the other hand, he appears to hold that a predisposition to tuberculosis is frequently transmitted, and he thinks that that plays a decidedly important *role* in the transmission of disease. He did not furnish evidence that convinces me that that is so. He said he had noticed that particular animals appeared to resist the disease more than other animals. Take an analogous case. We all know that when a horse, with the seed of glanders, is introduced into a large stud the whole of the animals very seldom become affected, but, as a rule, only some comparatively small proportion of them. But are we entitled to say that the majority escape on the ground of a measure of immunity against the disease? It may be so, but the evidence does not prove it. I think that the evidence in favour of a special predisposition to infection on the part of breeds in this country is not very strong, and I do not think the matter is very important, unless Mr. Sessions can point to a breed that has a very considerable degree of immunity. Our best breeds, we know, have no such immunity. The all-important point to remember is that no matter what is the degree of predisposition, an animal will never take tuberculosis until it has been exposed to the risk of infection.

With regard to tuberculin I can only say, after some experience of it, that I have absolute faith in it. Even though, on a *post-mortem* examination of an animal that had reacted, I failed to find tubercular lesions after spending two hours in the search, I would still decline to say that the animal was not tuberculous. I do not know that I have ever failed to find lesions in an animal that has reacted. I know that those competent to make a search have thus failed, but no one pretends that the most thorough *post-mortem* investigation will reveal every tubercular lesion. I should like to take this opportunity of making an explanation, because I have sometimes been erroneously cited as one of those who do not think the tuberculin test of great value. It is true that in the experiments which I carried out for the first Royal Commission on Tuberculosis no tuberculous lesions were found in one of the animals that had reacted, and that such lesions were found in a number of animals that had not reacted. But I have since pointed out that this result was due to the circumstances in which the test was carried out. At that time it was impossible to induce anyone to submit his dairy cows to the tuberculin test, and I had therefore to utilise for the purpose cattle that had to be killed under the pleuro-pneumonia slaughter order. The experiments had for the most part to be carried out at slaughter-houses, to which the cattle had been brought from their own byres, and in circumstances that would tend to disturb the temperature. Other observers have since found that the test is not reliable in the case of slaughter-house or market cattle, bnt I assert that it is absolutely reliable when carried out with animals standing undisturbed in their own premises. Wtth regard to the measures that ought to be adopted to control the disease that is a very wide subject, and I have hardly time to express an opinion upon that point. I think most of us would prefer not to express a very decided opinion until the present Royal Commission has issued its report. I think Mr. Sessions is a little too sanguine about our ability to deal with tuberculosis as a whole. He suggested the testing of all milch cows once a year. How many are probably in the country? A million? Say a million. It would cost at least £50,000, probably £100,000, a year to test them. And, in the meantime, you could not get veterinary surgeons enough for the purpose. That is, perhaps, not a great objection, because we could set to and make them, but I do not think that, on the grounds of expense, it is hardly

possible for us at the present time to deal with tuberculosis as we should like to deal with it. On the other hand, I am just as well satisfied that an individual who has tuberculosis in his herd can get rid of it without great expense. If there is such a great pecuniary loss as we are led to believe there is through the prevalence of tuberculosis it is worth the individual owner's while to deal with it himself; and I am confident that, by the use of tuberculin in the hands of his veterinary surgeon, anyone can, in a few years and at a comparatively small expense, get a clean bill of health for his stock.

Professor DEWAR said that, as a stranger, he felt highly favoured in being asked at that early stage of the meeting to make a few remarks in connection with this interesting and important subject. He did not think Mr. Sessions was very far wrong in his estimate of the number of cattle affected. His belief was that in Edinburgh they were, perhaps, as strict in the examination of cattle slaughtered for human food as in any city in the British Empire. In the last two years the number of cattle slaughtered in Edinburgh was, roughly speaking, 35,000 or 36,000 per annum. Out of this number the local medical officer of health seized all that were affected with tuberculosis. They might take it that very few were allowed to escape. During the last two years the number of carcases condemned in the slaughter-house had been under 200. Of these 20 carcases were those of imported cows. He was inclined to believe that the outbreak of tuberculosis was to some extent traceable to the buildings in which the cattle were placed. Mr. Sessions had alluded to apparent recovery in the use of tuberculin, that was, that in the repeated testing of animals with tuberculin it was sometimes found that an animal which did not react, reacted when it was again tested after an intervnl of six months or a year. Mr. Sessions described those animals as being more dangerous than those which reacted, because a false impression was created that they had actually recovered. He (Professor Dewar) thought they did sometimes actually recover. Finally, touching on the subject of the compensation to be paid, Professor Dewar considered it most unsatisfactory to fix a maximum value to be paid for an animal that had to be condemned. He would award full compensation for an animal apparently quite healthy on examination by a qualified veterinary inspector, which only an autopsy revealed to be diseased. But in the case of an animal that, on cursory examination, was manifestly affected with tuberculosis, he did not think the owner had very much claim for compensation for slaughter. It should be made the interest of stockowners to get rid of the disease, and not their interest to procure affected animals in order to realise compensation money in respect of slaughter.

Mr. S. VILLAR said he should like to point out one or two matters in which his experience of tuberculosis differed from that of Mr. Sessions. That gentleman informed them that his experience of tuberculosis in pigs was that it was virulently contagious and rapid in its course. Now, in the pigs that he (Mr. Villar) had seen affected with tuberculosis, the very opposite conditions almost invariably prevailed. His experience of tuberculosis in pigs was that while he was engaged in killing off many pigs because of swine fever existing on certain premises, he only occasionally came across one or two cases of tuberculosis in pigs, and he could also call to mind cases where sows affected with tuberculosis had reared their litters of pigs and the young had been fed off for the butcher in the ordinary way without developing symptoms of tuberculosis during the short period they were allowed to live. If tuberculosis was so virulently contagious and rapid in pigs as Mr. Sessions stated, he could not help thinking that there would be more pronounced symptoms of the disease and many more animals affected. Mr. Sessions asserted that the disease was so contagious in the case of pigs that a pig-stye which had held pigs affected with tuberculosis would, after it had remained empty two

months, infect any healthy pigs that might be placed in it. He (Mr. Villar) would like to have some statistics of this remarkable contagiousness, and also as to the contagiousness of tuberculosis in relation to buildings, among cattle. With regard to the percentage of cattle affected with the disease, 20 per cent. was said to be the estimate in the case of milch cows. It occurred to him that that percentage was really very moderate. His experience taught him that it was quite an exception to find, on *post-mortem* examination, milch cows absolutely free from symptoms of tuberculosis—milch cows, he meant, that had been kept in sheds and fed with food, such as brewers' grains, that rendered their constitution weak. In the case of cows injected with tuberculin, did Mr. Sessions hold that all the milk they yielded, say for 24 or 36 hours after injection, should be thrown away? Did he recommend that this should be sold for human consumption? Mr. Villar noticed that in one instance Mr. Sessions tested 83 animals in one night. Did he consider that animals which had received an injection of tuberculin were in a fit condition to supply milk for human consumption? That was a very important matter. The loss of the milk supply of 83 milch cows for one night and day he estimated at from £15 to £20, and he held that, if the milk had to be thrown away in consequence of the application of the tuberculin test, the dairyman was as much entitled to compensation for loss of the value of the milk as a grazier was for the loss of the value of his beef. Professor McFadyean estimated that from £50,000 to £100,000 a year would be needed to have an inspection once a year of all the milch cows in the country. He (Mr. Villar) was glad to hear this, and hoped that a start in this direction would be made very soon.

Mr. W. HUNTING said there was only one point to which he wished to devote a few minutes, and that was the point (which really was the point of the paper) that Professor McFadyean carefully avoided, namely, the control of the disease. Certainly the professor did suggest—as he had done before—that there was a simple way of control, namely, that every practitioner should advise his client to get rid of the disease with the aid of tuberculin. But that left all the people who were absolutely without conscience to supply their neighbours with animals picked out through the agency of tuberculin, and thereby spread the disease. In fact, it seemed to him that, in carryiag out the sort of selfish voluntary principles suggested by Professor McFadyean, what was done in the way of good with one hand would be absolutely undone by the other. If the disease was as important as they believed, surely it was worth treating by the State. As the essayist said, there were two reasons why something should be done. One was—and he was not going to exaggerate this reason—one was danger to human beings from meat and milk, and the other—and this was all-sufficient—was a very large loss of national productive power at the present time. If we had anything approaching the percentage of animals suffering from tuberculosis that had been represented—tuberculosis being a contagious disease likely to increase if not interfered with—surely that was a good reason why the State should interfere to protect the owner of stock and protect the nation from this serious loss. At any rate, he was inclined to think that there was sufficient evidence before them to warrant them in advising the State that some control should be adopted. Now they could not have anything like voluntary control. It was not a bit of good providing for pickpockets and such like unless they also supply policemen as executive officers of the law. And it was not a bit of use trying to put a stop to tuberculosis unless they had local authorities to enforce the law and to pay the veterinary inspectors for their services. It seemed to him that they had already an analogous disease and an analogous measure to that which they required in the case of tuberculosis. There was no disease in its spread so much like tuberculosis as glanders. There was no set of measures, as far as he could

see, so likely to suppress tuberculosis as those which had nearly suppressed glanders. In fact, they had only to substitute the word "tuberculosis" for "glanders" in the present order of the Board of Agriculture to have a really first-class measure for the suppression of tuberculosis. That order simply said that there should be compulsory notification of disease. Without compulsory notification they could never find a disease or do anything unless they had an army of thousands and thousands of inspectors to hunt the disease up. With compulsory notification they had, at any rate, power to find out the whereabouts of the disease, and thereby they were enabled to do something. But there was something else. So soon as they got compulsory notification, they would go through exactly the same procedure as they passed through in regard to other diseases, in relation to glanders twenty years ago, and in relation to foot-and-mouth disease. They would find half, perhaps more, of the intelligent agriculturists evading the Act all they could. And if they waited for the next 150 years with the voluntary principle the intelligent agriculturists would do the same thing, but they could affect him by compulsory notification of disease, and educate him up to the pitch in which they could do more. It was no use notifying merely. The inspector must examine the animals, and when he found one case clinically evident he had the right to suspect others, and to look for other cases. When he had found out, by the use of tuberculin, all the cases of tuberculosis, he should be able to enforce isolation of the diseased ones. There was no hardship to the owner in picking out all the diseased animals and forcing him to isolate them. On the contrary, the owner was benefited by prevention of the spread of the disease. But the infected animals could not be isolated for ever. Hence he proposed to get rid of them in this way: all the clinically diseased animals should be slaughtered and compensation paid for them. The other animals should be permitted to live on as they would have done in the hands of the farmer, either for breeding purposes or until they were sufficiently fed to be sold to the butcher. Of course he was aware there was a difficulty about payment of compensation. The amount to be paid was the all-important question. But if they left the Act to be carried out by the local authorities there was no doubt they would not pay too much, or do too much all at once. But you must leave the enforcement of the law in the hands of the local authorities in the first instance. This the Government has done in the case of other contagious diseases. The Board of Agriculture invariably allowed the local authorities to try the first experiment with any disease. And when the local authorities had taught the British public and the veterinary profession something about the disease, when, in fact, the latter coupled with the Board of Agriculture, had learnt all that was necessary, the Board generally took the matter into its own hands and appointed some naval officer to see that the law was carried out. They (the local authorities) had meanwhile taught the Board of Agriculture, the veterinary profession, and the public all that it was necessary to know. If they altered the glanders order as he suggested, and applied it to tuberculosis they would then very soon educate the people up to the necessary pitch. Tuberculosis was a disease that could only, he believed, be tackled effectually in the same way that they tackled glanders, cattle plague, or pleuro-pneumonia. He could not see that, if there was any argument in favour of a glanders order, there was not precisely the same argument in support of a tuberculosis order on precisely the same lines as the present glanders order.

Mr. J. A. W. DOLLAR said that although he could not pretend to have any great acquaintance with pigs, and still less with tuberculosis in pigs, yet during his stay in Berlin an example of the transmission of tuberculosis from tubercular cows to pigs, through the medium of milk, came under his notice.

Almost the whole of the city of Berlin was supplied with milk by one large milk contractor, Herr Bolle, who had about 800 or 900 cows. He had, on the outskirts of Berlin, a perfect little town in which he lodged his workpeople, and a model-farm which attracted the visitors to Berlin. When he (Mr. Dollar) first arrived in Berlin there was a tremendous outbreak of tuberculosis amongst Herr Bolle's pigs that were largely fed on the residue obtained from the separators in which the cream was separated from the milk. When the skimmed milk was run off there was left at the bottom of a reservoir a thick, curdy material which contained particles of foreign matters, and amongst them tubercular bacteria. This refuse formed a large part of the pigs' food. Notwithstanding all the care exercised, cows suffering from tuberculosis were introduced into Herr Bolle's herd, and, as a result, the residue of the milk they yielded being given to the pigs, many of the latter were affected by the disease. Soon afterwards tuberculin was suggested as a valuable diagnostic agent for the detection of tuberculosis, and Herr Bolle, who was a most go-ahead man, immediately had some experiments made when he was horrified to discover that 30 per cent. of his cows reacted to tuberculin. He did not proceed to slaughter, but had the animals isolated. In fact, he carried out very much the same plan Bang has suggested in regard to Denmark. He isolated the cows, boiled all the milk taken from them, and very soon got rid of the infected animals. That he (Mr. Dollar) thought showed very clearly how easy it was for pigs to become infected in that way, and it was also at the time a very valuable testimonial to the properties of tuberculin and the services it might render in rooting out disease in a herd. Since then Herr Bolle has kept his herd practically free from disease. A point was brought forward by Professor McFadyean as to the percentage of adult animals suffering from tuberculosis, and he apparently based his estimate of 20 per cent. of adult animals in Great Britain on the conclusions arrived at during the slaughter under the pleuro-pneumonia order. It occurred to him (Mr. Dollar) at the time that that was probably not quite a fair basis to take for the estimate of percentage of tuberculosis amongst all the cows of Great Britain, because he thought something must be set off in connection with that estimate for the predispositon which these animals would have to tuberculosis owing to the previous disease from which they were suffering—in fact, an attack of pleuro-pneumonia might possibly predispose to the onset of tuberculosis. His friend the professor did not appear to coincide in that view, and, perhaps, it was not well founded, but undoubtedly they would hear something more on the point. Bnt the points raised by Mr. Hunting were really, as he said, amongst the most important which they had to consider, namely, the manner in which they were to deal with the disease, and what was after all, the most practical way of stamping it out. Personally he (Mr. Dollar) was not in favour of compensation in connection with any disease. He thought the practical difficulties in the road were too great. In this connection he remembered having had some very long passages with his friend, Mr. Hunting, some years ago when that gentleman so strongly brought forward the question of compensation for glanders. As Mr. Hunting said, it was absolutely impossible to move in the question without leaving to the local authorities the work of dealing with the disease in the separate localities. As they had had a very fair example of what local authorities would do in connection with compensation, that was to say, they would do nothing at all, he thought Mr. Hunting's proposal to give compensation in tuberculosis was, to say the least, scarcely workable. Mr. Dollar suggested in lieu of this a system that worked very well in France. A buyer there detecting disease in his purchased animal, within a few days after the purchase, was given by the law the right of bringing an action against the vendor within three months of

the sale, for the recovery of damages in the event of the animal purchased being proved to have spread infection in his herd. That, Mr. Dollar thought, was a simple and practical measure which would work well in this country as it did in Fraace. Finally, he pointed out that under the amendment of the Public Health (Scotland) Bill they had another means of working for the diminution of tuberculosis along with other diseases. Veterinary inspection —a principle of the Public Health (Scotland) Bill—was not embodied in the measures under which they worked at the present time in London.

Mr. SAMSON said he, personally, when engaged under the pleuro-pneumonia order, had simply concerned himself with that disease, and had not looked for tuberculosis. Hence, if the figures quoted as to tuberculosis were based upon the information gained when veterinary surgeons were busy carrying out this order, he felt sure they must be decidedly wrong.

Reply.

Mr. SESSIONS, in reply, said : I must thank you for dealing so very lenien tly with my paper. I am quite conscious that a great many points that I might have touched upon have been omitted, and I am also perfectly conscious that on a subject like this all of us hold more or less divergent views—views probably based on our individual experience. As to tuberculosis in pigs to which several speakers have referred, I may say that in the first instance I have in my mind between 70 and 80 pigs were affected. They were fed on barley meal. There was no milk given them at all and no offal. I saw them all nearly every day of their lives and I believe there was no means of any extraneous infection. I believe it was a case in which they were infected from this one source. I think a great many of the outbreaks amongst pigs occur through their having milk from tuberculous animals. That is the primary cause, I believe, but when one pig is affected I think you will find the disease is easily passed on to the other pigs ; and, in many instances, it is very virulent. With regard to the percentages I have mentioned, I purposely tried to take a low percentage. I thought if I took a fuller percentage of animals affected it would make the annual loss to the country so very great that it would hardly be credited, and probably damage the cause I have in view by exposing me to a charge of over-stating the case. The fact that the speakers in the discussion agree that the figures should be larger strengthens our case that there should be some control over tuberculous animals. Prof. McFadyean, I think, asked what breeds were most free from tuberculosis? The Welsh and the Highland cattle, Herefords to certain extent, Sussex to a less degree, and Devons to the last degree. With regard to animals being immune, I strongly think there is a certain amount of immunity in certain constitutions and tissues. Some families of cattle which I have known for several generations seem to be affected with tuberculosis almost directly they are put in a stall and brought into contact with disease, while in other families that are living under the same conditions you can trace the animals back through several generations, and they seem to be able to withstand the atmosphere of the cow-stall, and certainly show no physical signs of the disease. As to the owner getting rid of tuberculosis himself. The owner can do it, and ought to do it, where he breeds his own animals. But in present conditions I do not think it is possible for an owner to stamp out tuberculosis where he has to buy fresh cows in the market-place or elsewhere, where there is no means of testing them. When he has got them home he probably thinks it hardly worth while to test them then, and so puts up with what he has purchased. I am glad Prof. Dewar supports me as to buildings affecting cows. I am strongly of opinion, from my own experience, that when you have got rid of tuberculosis out of a herd or cowshed, and have placed fresh healthy animals in that shed, that when the latter show symptoms of disease they have contracted it

through something existing in the building. Months after a building has been cleared of infected animals I have placed in the cowshed healthy beasts, with the result that they have become affected with tuberculosis. As to contagiousness, it is difficult to give statistics, but we certainly know that cattle are easily affected from each other. I have found that an animal tied up to a tuberculous animal would, after six months, react to tuberculin, and that a third animal put near them would six months afterwards do the same. With regard to throwing away the milk during the injection of tuberculin, as far as I have been able to ascertain no ill results have occurred from the use of milk derived from cows infected with tuberculin. He had tested such milk, and knew no reason why it should be thrown away. Its disuse would be a mere matter of sentiment. There was no danger in its use. When we are testing a herd of cows and have to take the temperatures every three or four hours, we sometimes find a drop in the milk supply of from 60 to 10 gallons the next day or two. That is a serious matter to the farmer and one which he does not relish. I have found this thermometer case that I have invented obviates that difficulty. The animals do not object to the insertion of the instrument, and there is no loss of milk. Mr. Hunting expressed some views concerning isolation and compensation. I believe Mr. Hunting will have the opportunity soon of seeing Sir Richard Thorne-Thorne who, I have no doubt, will explain fully his views about compensation, as to which he holds strong opinions. I do not think, save in the case I set forth in my paper, there should be compensation. What you want compensation for is to offer such facilities as will induce people of their own initiative to get rid of animals while they are in a comparatively useless state.

On the motion of the CHAIRMAN, seconded by Mr. SAMSON, a cordial vote of thanks was given to Mr. Session for his paper, after which the meeting, which was the last of the session, terminated.

EXPERIMENTAL AND CLINICAL STUDY OF THE ASPERGILLUS FUMIGATUS.

(Contributed to the *Bulletin de la Société Centrale de Médécine Véterinaire.*)

BY A. LUCET.

(*Continued from page* 394, *vol. xliv.*)

III. (*a*) *Inoculations. Experimental Mycoses.*

My inoculations were effected on geese, hens, pigeons, rabbits, guinea-pigs, dogs, and sheep successively. Most of them were performed by the intravenous method; some, however, were made either in the conjunctiva subcutaneously, or in the peritoneum, the trachea, or the lung. But whilst the first, with certain species, at least, were always followed by a rapid death, the others had a much less active and regular effect, and it often happens that when they are used the subject recovers after having been more or less seriously ill.

I. On the 27th June, 1891, I inoculated into the peritoneum of an adult guinea-pig two cubic centimetres of a rich emulsion of spores of the *Aspergillus fumigatus*, raised on a culture of potato, fifteen days old. After having been ill for a week this guinea-pig recovered. Inoculated a second time on the 20th July following with spores from a culture five days old, it still offered resistance.

II. On the 11th February, 1892, a rabbit six months old received in the peritoneum two cubic centimetres of sterilised veal-bouillon, holding in

suspension an enormous quantity of spores raised from a culture on beer-must eight days old. The next day it was mopish, ate little, and stayed crouching in a corner. Then it grew thin, and died on the 3rd March in a pronounced state of cachexia. Its autopsy revealed accentuated lesions of the liver, kidneys, epiploon, and mesentery.

III. On the same date a rabbit of the same age was inoculated with spores of the same origin and under the same conditions. Though ill at first for a few days, it soon recovered its liveliness, and at last got better.

IV. On the 20th March, I introduced directly into the lung of a rabbit a year old, by means of a puncture made by the help of the Pravaz syringe through the intercostal muscles, two cubic centimetres of sterilised distilled water, holding in suspension spores gathered in a carrot-culture three weeks old. This subject resisted the inoculation, after having been very ill and losing half its weight.

V. On the 15th August, 1892, a goose, a year old, was inoculated in the lung by the same process, with spores gathered in a culture on gelose, ten days old, and emulsioned in a small quantity of sterilised bouillon. Very ill the next day; it died on the 24th. Its autopsy revealed tubercles, in small numbers, on the right lung, which was the one that had been injected, and in great quantities in the liver.

VI. On the 20th August, 1892, spores from a recent culture on potato were, after tracheotomy, by means of a little spatular of platinum, introducted into the trachea as far as to the ends of the bronchi, in a goose a year old. Two days afterwards the same operation was repeated on the same subject, with spores gathered in a culture on beer-must a year old. The result was negative.

VII. On the 3rd October, 1895, the same inoculation was made on a pigeon, two years old, with conidia raised in a recent culture on beer-must. Here again the bird resisted.

VIII. On the 12th April, 1893, an adult rabbit was inoculated in the same way, with spores raised on a carrot-culture twelve days old. At no moment did it seem to suffer from it.

IX. On the 20th June, 1894, I introduced into the lung of a guinea pig, by the help of the Pravaz syringe, one cubic centimetre of bouillon, holding in suspension, an abundant quantity of spores raised in a culture on potato. After having been pretty seriously ill, this subject recovered.

X. On the 6th March, 1895, a fowl, a year old, received in the trachea, by the help of the Pravaz syringe, a rich emulsion of conidia, raised in a young culture on Raulin's liquid. It died on the 15th March, with accentuated lesions of the lung and the liver.

XI. On the other hand, another fowl, of the same age, inoculated at the same date and with the same spores in the very same way, resisted perfectly.

From this first series of experiments an evident fact is brought to light; it is the relative mildness of the inoculations even in large doses, of the spores of the *Aspergillus fumigatus* when performed on the lungs, trachea, or peritoneum, with subjects which, however, can be inoculated with the greatest ease by the intravenous method, and some of which even (for instance, the birds), in a good many cases contract *spontaneous Aspergillose*, which sometimes in their case assumes an epizootic character. The conclusion to be drawn is that the sound organism defends itself vigorously and often with success against infections of this nature, and that under ordinary conditions of life it is necessary, in order that a mycotic affection may develop in a subject apt to contract it, that a certain number of auxiliary causes should lend their support to the spores accidentally inoculated. As the organ of predilection for spontaneous mycotic disorders is certainly the lung, it is quite clear that in the majority of cases inoculation takes place through the air breathed in being charged with spores which come to a standstill in the

bronchi; now, since the infection is difficult to produce experimentally in this manner, the result is that a special preparation of the soil—a preparation dependent on all the causes which can weaken the organism and render it less fit for the struggle it must make—is indispensable for the evolution of these affections. This operation of certain causes is thrown into prominence by the following experiments:—

I. On the 10th May, 1895, in order to gain an insight into the conditions under which the spontaneous mycotic infections develop, I blew into the bronchi of a fowl, a year old, through an opening made in the trachea, spores in the dry state, raised on a recent potato-culture. This fowl resisted the inoculation. On the 20th June following, after having submitted it for two or three preceding days to irritating inhalations of ammoniacal fumes, I administered a fresh quantity of spores in the same way into the trachea. On the 30th June it seemed seriously ill. Killed on the 4th July, it showed fine mycotic lesions of the respiratory apparatus.

II. On the 2nd August, 1895, a pigeon, a young goose, and a hen were subjected to the same tests. With all of them the results were identical. Killed 15 days later, they presented all the mycotic injuries to the pulmonary apparatus in a highly-developed form, not only in the shape of tubercles, but, further, with the appearance which lesions of a *spontaneous Aspergillose* present.

Ingestion of the spores mixed with food furnished results still more frequently negative than ordinary peritoneal, tracheal, or pulmonary inoculations.

I. Only once in ten experiments, which consisted in giving the rabbits for food oats with which I had mixed conidia of every age and of every growth, did I get a positive case, and yet, on autopsy of the animal that succumbed, in place of lesions of the digestive apparatus I found only pulmonary tubercles, a fact which would lead one to believe that the inoculation is produced not by ingestion but rather by inhalation. By means of subcutaneous inoculations I have never been able to cause infection. In all my experiments which were performed on the rabbit, guinea-pig, and hen, I have always obtained simply either a small, hard kernel confined to the point inoculated, or a small abscess of slow growth, in which at the end of, sometimes, a very long time, I have constantly found the spores which were injected, and which had lost none of their vegetative or pathogenic qualities. A single intra-pulmonary, tracheal, peritoneal, or subcutaneous inoculation, which has remained without serious effect, but has nevertheless provoked, in the three first cases at least, a special state of illness, does not guard against a new infection, nor does it bestow immunity.

I. On the 12th September, 1891, I injected into the jugular vein of a guinea-pig that had previously resisted two successive intra-peritoneal inoculations a cubic centimetre of a strong emulsion of conidia, gathered on a beer-must culture, dating from the 1st September. It died on the 16th. On an autopsy being made, the blood was found coagulated and black, and interstitial hæmorrhage had invaded the whole of the right thigh; the liver was enormous, but without any apparent tubercles; the spleen was hypertrophied, and stuffed with grey miliary granulations; the kidneys normal. Tubes of gelose sown with the splenic pulp furnished cultures of the fungus-mould inoculated.

II. On the 28th April, 1892, a rabbit, which had been inoculated two months before, but without success, in the peritoneum, received into one of the veins of the left ear two cubic centimetres of sterilised water holding in suspension spores from a month-old potato-culture. It succumbed during the night of the 29th. Its autopsy showed splendid lesions, tubercular in form, of the liver, kidneys, and heart, lesions which all reproduced *Aspergillus fumigatus* on being sown on carrots.

III. On the 3rd of June, 1893, a rabbit, already inoculated without result in the trachea, on the 12th April preceding, was re-inoculated intravenously with spores gathered on sour chicken-bouillon. Death took place on the 7th June, with lesions of the liver and kidneys. Not only did these give positive cultures, but, further, the blood of the heart itself furnished, when sown on gelose, an abundant crop of the fungus.

Intravenous inoculations in large doses soon prove fatal to the goose, hen, pigeon, guinea-pig and rabbit. With smaller doses death supervenes more slowly, and sometimes at the end of a pretty long time. With extremely weak doses the animal may recover, but all the same it always remains subject to the action of a new inoculation, and acquires no immunity.

I. On the 6th January, 1892, I injected into one of the veins of the right wing of a fowl one cubic centimetre of a black emulsion of spores from a recent potato culture. It died on the 10th. On an autopsy being made, the liver and the spleen were found enormous, but a few tubercles were apparent only on the former of these organs. However, six tubes of gelose, when sown with the splenic pulp, furnished positive cultures.

II. On the 10th March, 1893, a pigeon two years old was inoculated intravenously with a very strong emuls on of conidia gathered in a culture of beer-must, ten days old. It succumbed during the night between the 14th and 15th. The lesions consisted of an infinity of miliary tubercles scattered over the liver and kidneys, tubercles which, when sown in some chicken bouillon, yielded very fine cultures.

III. A guinea-pig was inoculated on the 21st June, 1893, in the right jugular with one cubic centimeter of sterilised water holding in suspension a very great number of spores raised on a not very old carrot-culture. It died on the 26th. Its autopsy showed only lesions of the spleen, which was hypertrophied and crammed with very small greyish tubercles. Blood from the heart and hepatic pulp, when sown on acid gelose, furnished, however, positive cultures.

IV. On the 16th August, 1892, I injected into the vein of the left wing of a goose of that year's brood two cubic centimetres of bouillon holding in suspension spores gathered from a culture on the same liquid, and fifteen days old. It died on the 21st. Its liver was thickly covered with an infinite number of small grey granulations. A cubic centimetre of this organ, removed aseptically and then placed on the stove at 37° in a damp chamber, on the third day afterwards gave birth to a tuft of *Aspergillus fumigatus*, which did not take long in bearing fruit.

V. On the 12th July, 1893, a rabbit received into one of the veins of the left ear a very rich emulsion of spores gathered on a culture in beer-must, and two months old. It succumbed on the 17th. On autopsy being made there existed large tubercles in the kidneys and the heart, and smaller granulations in the liver. Further, there were still some tubercles in the thickness of the intestinal walls and in the muscular tissue. Sowing of tubes of gelose by means of these granulations yielded positive cultures.

VI. On the 13th February, 1895, I injected into one of the jugulars of a healthy guinea-pig two cubic centimetres of a very rich emulsion of spores raised on a potato-culture three months old. It died on the 15th, with an infinite number of tiny greyish tubercles of the liver, spleen, and lungs. The latter presented a very marked transparent appearance. All yielded vigorous cultures in sour bouillon.

VII. On the 6th June, 1893, I inoculated a rabbit intravenously with half a cubic centimetre of sterilised veal-bouillon holding in suspension a very small quantity of spores gathered on a recent beer-must culture. It only succumbed on the 20th June. Of extreme thinness, it showed on autopsy voluminous tubercles of the kidneys, heart, and liver.

VIII. On the 4th February, 1894, a rabbit received in the circulatory stream half a cubic centimetre of sterilised water, holding in suspension a small quantity of spores gathered on an old carrot-culture. It died on the 23rd February. Its lesions consisted of enormous tubercles spread everywhere over the kidneys.

IX. On the 10th April, 1895, quarter of a cubic centimetre of a rich emulsion of young spores in ordinary bouillon was injected into the blood system of a guinea-pig. On its death, which took place on the 28th April, it presented pretty voluminous granulations of the liver, the spleen, and the kidneys. These granulations, which were white and resistent, reproduced *Aspergillus fumigatus* on culture.

X., XI., XII. Three rabbits were inoculated in the blood-system on the 3rd June, 1895, the 28th June, 1895, and the 8th August, 1895, with a quarter cubic centimetre of a very weak emulsion of spores in alkaline bouillon. For a pretty long time all these subjects were ill, and grew thin; then they gradually regained a satisfactory state. Re-inoculated all three of them on the 28th September, 1895, in the circulatory stream, with a strong proportion of spores. They died on the 1st, 2nd, and 4th October successively. Their lesions consisted of young tubercles spread over the kidneys, liver, lungs, heart, and muscular tissue.

We have already several times seen in the course of this work the *Aspergillus fumigatus* preserve its virulence intact, whatever may have been the surroundings employed for its cultures or whatever the age of these latter. Now this pathogenic action always remains invariable, in whatever way it; be preserved, from the moment when it has *not* lost its vegetable power, this behaviour on the part of germs capable of provoking mycotic diseases constitutes one of the differences between these affections and infectious diseases properly so called.

I. On the 9th May, 1893, I inoculated a rabbit intraveneously with an emulsion of spores raised from a potato-culture dating back from the 21st August, 1892, preserved in the light and temperatnre of the laboratory. It died on the 15th May, and its autopsy revealed pronounced lesions of the kidneys, liver, heart, the intestinal walls, and the left intercostals.

II. The same day a rabbit received into one of the veins of the ear two cubic centimetres of sterilised bouillon, containing in suspension a great quantity of spores gathered on a potato-culture dating from the 14th March, 1892, and preserved as before. Death took place on the 14th May, with lesions of the kidneys, liver, and some muscular masses, notably those of the right thigh.

III. On the 14th July, 1895, spores of the *Aspergillus fumigatus* from a culture dating from October, 1891, and preserved in a dry state in a cardboard box, subject to the atmospheric variations of the laboratory, were inoculated intravenously into a vigorous rabbit a year old. This subject died on the 21st July. Autopsy showed marked tuberculiform lesions of the kidneys and liver.

If, so far, all the animals on which I have made experiments with the *Aspergillus fumigatus* have showed themselves very sensitive to its action, it is not the same with the dog and the sheep. In the cases, indeed, in which I investigated the receptivity of these animals as regards this fungus I got nothing but negative results.

I. On the 5th March, 1893, I introduced into the right femoral vein of a dog, ten months old, six cubic centimetres of sterilised veal bouillon, holding in suspension an enormous quantity of spores of *Aspergillus fumigatus* raised on a recent potato-culture, The next day, and for several days, the animal was mopish, and ate little. Gradually it recovered its liveliness, then its appetite, and at last got better. Re-inoculated anew on the 30th March, it still resisted. Killed on the 15th April, autopsy revealed no lesions.

II. On the 8th June, 1893, an old dog, deaf, emaciated, and covered with scurvy, which had been handed over to me, received into the right femoral vein eight cubic centimetres of a black emulsion of conidia of the *Aspergillus fumigatus* cultivated in beer-must. The next day, crouched in a corner of its kennel, it refused to eat. The following days it remained for the greater part of the time curled up, and showed a little breathlessness. Gradually these signs of illness disappeared, and it soon seemed completely recovered. Killed on the 30th June, there could, on autopsy, be found no lesion which could be ascribed to the inoculation.

III. On the 22nd July, 1895, a horned sheep affected with "sturdy" was inoculated intravenously with six cubic centimetres of a rich emulsion of young spores raised from a culture in Raulin's liquid. On the 27th July it was re-inoculated with an equal dose of a similar emulsion. On the 2nd August a third inoculation was made, and at the same time I injected some spores into the anterior chamber of its right eye. For some days following these different inoculations it showed no irregularity in its general condition. On the other hand, the right eye was the seat of violent internal ophthalmia. Killed on the 9th August, all the internal organs were found free from mycotic lesions. The aqueous humour of the inoculated eye was very rich in leucocytes and contained a few short and slender mycelian fragments and a very great number of spores which had preserved all their normal physical appearance. These latter, when sown in Raulin's liquid, soon yielded a very fine culture.

From all the experiments and researches mentioned above we may draw the following conclusions:—The *Aspergillus fumigatus* is a mucedine which is very plentiful in nature, and its spores are exceedingly common among the plants or seeds that are useful for animal and even for human nourishment. They are very resistent to all natural causes of destruction, and are susceptible of evolution in a great number of animal organisms. They possess a pathogenic action which is inherent in them, which constitutes one of their properties, and renders them capable of producing a special and serious affection, whose lesions generally present a tuberculiform character. They preserve this virulence intact, whatever be their origin and their age, as long as they keep their vegetative power. The goose, fowl, pigeon, and guinea-pig, though very sensitive to their action by intravenous infection, naturally resist their efforts pretty well when inoculation is tried in any other way. The dog and the sheep seem refractory to it, at least, under ordinary conditions of inoculation.

THE TICK TROUBLE.

WE are indebted to the Minister for Agriculture for the following latest progress report received by the Chief Inspector of Stock from Dr. J. S. Hunt, who is carrying on experiments with reference to tick fever in the vicinity of Hughenden:—

In view of the desirability of obtaining definite evidence as to the safety and efficacy of inoculation with the blood of a recovered animal as a means of protecting cattle from tick fever, the following experiments, recently performed here, are, I venture to think, of sufficient interest to warrant their being at once communicated for the information of your board.

The experiments in question were designed to ascertain:—

1. The amount of immediate danger incurred in inoculating clean cattle with various quantities of blood from a recovered beast.

2. The protective efficacy of such inoculations—(*a*) against virulent tick infection; (*b*) against injections of virulent blood from an acutely diseased beast.

3. The protective efficacy of small daily doses of arsenic—(*a*) against virulent tick infection; (*b*) against injections of blood from an acutely diseased beast.

It will be at once observed that these experiments. so far as inoculation with the blood of a recovered beast is concerned, are on the same lines as those instituted at Mundoolan. From the scientific standpoint they are decidedly inferior to the Mundoolan experiments, not only on account of the smaller numbers dealt with, but because the absolute cleanliness, past and present, of cattle within the infested area is always more or less open to question. On the other hand, from the purely practical point of view they are, I think, of considerable interest, because they were carried out under precisely those conditions in which protective treatment is mostly called for, namely, in the case of cattle yet unaffected with disease in the tick-infested areas, and cattle threatened on the borders of those areas. In neither of these cases can the absolute cleanliness of the cattle be assured, nor, so far as the interests of the owners of such stock is concerned, is this of any importance, because, whether perfectly clean or not, such cattle are certainly susceptible to the disease, and, therefore, require protection.

It may, perhaps, be suggested that for experimental purposes, to determine the actual value of any given method of inoculation, the bare possibility of any of the cattle employed being partially, or even wholly, immune from some previous tick infection is an absolutely fatal objection to the validity of any deductions that might be drawn from such experiment. But as against this it must be remembered that all the cattle employed were of the same class, and drawn from the same locality, and even though a percentage of them might possibly have been partially or wholly immune, the error from this cause was equally distributed over the whole lot, and would not affect the comparative results as between those inoculated, those treated with arsenic, and those used as "controls."

The conditions requisite for carrying out the proposed experiments were:—1. Clean cattle, or cattle from a locality where no disease had been. 2. An animal that was known to have had the disease and recovered (from which to obtain the blood for the protective inoculations). 3. A virulently tick-infested paddock—*i.e.*, where susceptible cattle were known to succumb to the disease. 4. An acute case of tick fever (from which to obtain virulent blood wherewith eventually to test the efficacy of the protective inoculations).

These conditions are not, I think, as a rule very difficult of attainment in the North. They were all present at Glendower, thirty miles from Hughenden, up the Flinders. And here, by the kind courtesy of the owner, Mr. Robert Gray, and with the hearty co-operation and assistance of Mr. A. W. Ferguson, the manager, our experiments were carried out.

The required bullocks were brought in for our use from the upper or clean end of the run, where neither ticks nor disease had been seen. It was proposed to inoculate ten, treat ten with arsenic, and use the remaining ten as "controls."

On the 24th April ten bullocks were accordingly injected behind the shoulder, with doses varying from one to ten cubic centimetres of defibrinated blood taken from a beast that had completely recovered from a severe attack of acute tick fever. Unfortunately, two of these bullocks escaped into the bush the next day, and all that is known about them is that they were seen alive and apparently well some weeks afterwards. Eight bullocks, therefore, were actually employed in this experiment, and it was decided to use only a corresponding number of "controls." As a result of this inoculation most of the bullocks developed a certain amount of fever, in some cases reaching as high as 106·4 Fahr. on the seventh to the fourteenth day. The numbers employed were, however, too small to give any very reliable information as to the first object of the experiment—namely, to ascertain the amount of immediate danger to the cattle as the direct effect of the inoculation.

On the same day that these inoculations were carried out, the ten bullocks to be treated with arsenic received their first dose. For the sake of accuracy of dosage and certainty of administration, the arsenic was given in weak solution by hypodermic injection. Each animal thus received daily during the first week one grain, during the second two, and during a few days of the third week three grains of arsenic.

All twenty-four animals subsequently depastured for five weeks on a virulently infected spot, and became duly tick-infested. They were tailed by day, yarded by night, and their temperature taken each morning at break of day. The results of this exposure to virulent tick-infection were as follow:—

Of the ten treated with arsenic, six contracted the fever, and three died.

Of the eight "controls," two contracted the fever; none died.

Of the eight inoculated, none contracted the fever.

On the 29th May—exactly five weeks after the inoculation—all the surviving bullocks were subjected to a further test of an injection behind the shoulder of 20 c.cm. of virulent blood from an acute case of tick fever.

The results of this second test were as follow:—

Of the seven surviving bullocks treated with arsenic (three of which had already had the disease from tick infection), two contracted the fever, and both died.

Of the eight "controls" (two of which had already had the disease from tick infection), four contracted the disease; none died.

Of the eight inoculated (none of which had suffered from tick infection), none had any rise of temperature whatever.

It should be stated that such of the "arsenic" and the "control" bullocks as had suffered fever from exposure to the tick infection, were not in any case affected by the subsequent injection of virulent blood. Hence the result of both tests it will be seen that—

Of the ten treated with arsenic, 80 per cent. suffered from the fever.

Of the eight "controls," 75 per cent.;

And of the inoculated, 0 per cent.

If, as I confidently anticipate, these results are corroborated when the animals inoculated at Mundoolan are put to the test, it would seem only necessary to remark that the inoculation can be done without difficulty by any practical stockman, armed with a suitable syringe, and that the present cool season is a pre-eminently favourable time for inoculation. It should be stated in connection with these Glendower experiments that, by the generous and public-spirited action of Mr. Gray, it was arranged that only such animals as were actually destroyed should be charged to the department. We are also indebted to him and to Mr. Ferguson for the amenities and conveniences of the station whilst the experiments were in progress.

I have just received a letter from a practical cattleman, who watched our Glendower experiments very closely—with, I think, at first a little scepticism. He says: "I certainly intend to inoculate the stud cattle, feeling my way carefully, and am now erecting yards at ——— for that purpose. If we could get rain and green grass, I would not hesitate a minute to put 'tick fever' through all the studs with the exception of the cows that are in calf, and I feel sure the results 'would be satisfactory.'"

Correspondence.

To the Editor of THE VETERINARY JOURNAL.

NEW ASEPTIC HYPODERMIC SYRINGE.

SIR,—In this month's VETERINARY JOURNAL appears a hypodermic syringe introduced by Messrs. Hewlett & Son *as a new invention*. We have made syringes for years past *in every way the same*, in fact the asbestos plungers were originally introduced by us, and such syringes are fully described in our Catalogue, figure 29, page 10, published 1893. Since that date we have fitted them in aseptic metal cases, and with tubes for mallein and tuberculin. For many years syringes have been made by us with glass barrel and mount to screw, so as to easily take apart for sterilization; moreover, upon reference to the report of the Central Veterinary Association Meeting of March the 4th, 1897, will be found described a Veterinary Hypodermic Syringe suggested by Vet.-Captain A. J. Haslam, F.R.C.V.S., M.D., A.V.D., which has all and more than is claimed by Messrs. Hewlett & Son.

We regret taking up your valuable space, but in justice to ourselves we could not allow this to be called a new syringe and the *first case introduced* for ordinary doses of mallein.—Your obedient servants, ARNOLD & SONS.

August 3rd., 1897.

Legal News.

AN UNFORTUNATE PURCHASE.

IN the Queen's Bench Division on Monday, August 9th, Mr. Justice Wills had before him the case of De Lussan *v.* Pratt, which was an action brought by Mr. Alfred De Lussan, Woodcroft Gastle, Market Deeping, to recover £73 10s., the price which plaintiff had paid for a hunter. Mr. Lussan stated that on December 21st he went to Tattersall's, and purchased a hunter named Quicksilver, for which he paid £73 10s. The catalogue stated that the horse was a good hunter and fencer, and had hunted that season with the West Surrey Staghounds. At this time witness had stables at Stamford for hunting, and when the horse arrived at those stables he found that it was

suffering from influenza and was lame. Plaintiff called in a veterinary surgeon, and when the horse recovered it was returned to Messrs. Tattersall, as it was not capable of being hunted. The horse was resold on March 15th, and realised £36 15s. According to conditions of sale, "a good hunter" must be sound in wind and eyes, quiet to ride, and capable of being hunted.

Mr. F. L. Cook, a veterinary surgeon practising at Stamford, said when he examined the horse at Stamford on December 22nd he found it suffering from influenza. Later, he discovered that the horse was lame.

In cross-examination, witness said he did not believe that the horse took cold after it had left Messrs. Tattersall's stables. The temperature of the horse was 162 4-5, and the normal temperature of a horse was 99.

Mr. Henry Pratt, the defendant, said that he purchased the horse from a farmer in October, fearing that the hunter he then possessed would not jump well. Subsequently, he found that his hunter jumped well, and then he resolved to sell the horse in question. Before selling it he rode it with the West Surrey Staghounds.

In cross-examination defendant said if he purchased a good hunter in the middle of the hunting season he should expect it to hunt at once.

Several witnesses gave evidence to the effect that the horse did not show any sign of illness at the time it left Messrs. Tattersall's stables.

Professor M'Queen, of the Royal Veterinary College, Camden Town, said he examined the horse on January 9th, and found it sound. The normal temperature of a horse was originally fixed at 101, but recently there had been a tendency to reduce it to 100 3-5.

In cross-examination witness said 99 was a very rare normal temperature in a horse. A horse with a temperature of 103 was not in a proper condition to hunt.

By the Judge: Influenza caught a horse suddenly, and probably the horse in question contracted the disease in the horse-box after it had left Messrs. Tattersall's stables.

Mr. Justice Wills said the plaintiff had failed to satisfy him that the horse caught the influenza while it was at Messrs. Tattersall's stables. He gave judgment for the defendant, with costs. The plaintiff would be credited with the net proceeds of the resale.

THE HORSE DEALING FRAUDS.
CONVICTION OF THE ACCUSED.

At the Edinburgh Sheriff Court to-day, before Sheriff Rutherfurd and a jury, James Douglas, a middle-aged man, came up for trial in connection with what have become known as the "alleged horse frauds." There were in all six charges against the accused for fraud against six separate individuals, and generally he was accused with having formed a fraudulent scheme of obtaining money on false pretences. The dates of the transactions extended from May 25th, 1897, to June 23rd, 1897, and the names of the complainants were:—Dr. J. H. Balfour, Portobello; Francis Eeles Dickson, butcher, North Berwick; John Smith, carting contractor, Fushiebridge; Jas. Aitchison, farmer, Reston; Adam Jones, butcher, Musselburgh; and John Kinghorn, tailor, Musselburgh; and the various complaints, with the exception of the last two, were of a similar nature, viz., that he offered horses for sale as sound and good workers in harness, and thereby induced the complainers to buy the horses. The fifth charge was that he pretended to Adam Jones that if he would supply him with horse-feeding stuffs, hay, straw, and other goods, he would pay him for them, and got goods to the value of £3 5s. 4d. without paying or intending to pay for them. The last charge was that he fraudulently got a suit of clothes from John Kinghorn. The prisoner pleaded not guilty, and was defended by Mr. David Murray, solicitor.

Dr. Balfour deponed that his attention had been called by his coachman to an advertisement in a newspaper offering horses for sale by a man at Musselburgh. His coachman went down and saw what he thought was a suitable horse. The accused brought the horse up to him (Dr. Balfour) and he was pleased with it. He (the prisoner) guaranteed the horse as a good worker, sound, and quiet in harness, and it was ultimately agreed that £17 was to be paid for it, and that he was to get a week's trial of the horse. Douglas asked for payment, and, if it did not suit, he would take it back at once. A cheque was then paid and the horse was taken home. Afterwards a trial was given to the horse, and it could not be got out of the stable either by coaxing or forcing. His next step was to send his coachman down to see the accused again with the horse. It was ridden down, and seemed to go well enough in the saddle, though it would not work in harness. The coachman left the horse, but did not bring the money, and on a later day Douglas expressed sorrow that he could not pay the money, as he had had to settle some bills, which, he added, he would not have paid if he had not felt sure that the horse would turn out suitable. He also stated that he never knew the horse to act similarly before. Dr. Balfour said he had not got his money back.

In reply to Mr. Murray, the witness said he did not inform the police ; the police came to him. All the trial the horse got was that it refused to leave the stable yard. He saw nothing wrong with the horse, and he thought it was a very nice animal.

James Paterson, coachman to the last witness, gave somewhat similar evidence. He also was satisfied with the appearance of the horse, but stated that when it was tried next day it would not move. It would not go at all. He took the beast back to Douglas, who expressed surprise, because the horse was usually a very good worker.

Cross-examined—Witness said the horse went very nicely into the trap, but would not move after that. He saw nothing wrong with it as regards soundness, but the animal was warranted to work in all sorts of harness. The horse had a slight sore on its breast.

Francis Eeles Dickson said he also saw the advertisements in the newspapers, and as a result had dealings with the accused. He wanted a horse to draw a butcher's van. He wanted Douglas to let him see it in a trap, but the accused said he had no trap, and stated that it was a genuine good beast quiet in harness, and a good worker. He got the horse on seven days' trial, and he paid the money—£17—that day. Two days later it was tried more than once, and refused to go. He consulted a veterinary surgeon, and went to see Douglas in consequence. He could not see him, and wrote to him, in reply to which letter Douglas told him to try the horse again. That he did, and again he found it would not work. It could not be made any use of, and he afterwards sold it to Messrs. Scott and Croall's without any warrant for £5. It had a sore on its breast.

William Ballantyne said he was a veterinary surgeon at North Berwick, and that he had examined the horse. He discovered that it was not a sound horse in harness, and when he saw it in a van it would not go at all—it went backwards. The money paid was too much.

Wm. Smith, in reply to the Procurator-Fiscal for Mid-Lothian (Mr. R. L. Stuart, W.S.), stated that he saw an advertisement for cart-horses, applications for which were to be made to Leslie, Montgomery Street, Edinburgh. He saw a nice-looking beast, and Douglas—he only knew him to be Douglas after he had paid the money—guaranteed it as a good animal for cart work. It had been drawing, he said, from 30 cwt. to 2 tons from the docks. They made a bargain, and he paid £16 for it. Witness said he wanted the horse on trial, and demurred to having to pay for it at the time, but Douglas would not allow him to have it on credit, remarking that he would not give a horse to his

own father without getting the money. He tried the horse on the Saturday, and it went well enough then. On the following day he was not so well satisfied, and he then thought there was something wrong with the horse's wind. He yoked the horse on the Monday, and then he found it was beginning to break thoroughly out, and he had got into such a state that he could not do his work. He took back the horse to the accused, but he could not get the money, though Douglas gave him an I.O.U. for the amount, fixing the date when he would pay. He then left his lodgings.

In the course of cross-examination, witness said that the horse's lungs had been set, and explained, in reply to the Sheriff, that what he meant was that the horse had been doctored in some way or other. A horse treated in that manner was liable to break down at any time.

P. J. Combe, veterinary surgeon, Pathhead, deponed that, after examining the horse, he discovered that it was an inveterate rank roarer, and, therefore, unsound. It was the worst case of roaring he had ever seen in his life. In cross-examination, he deponed roaring was an incurable disease, and, in reply to the Sheriff, witness stated that roaring could be concealed for a time, but it soon reappeared. Shot was very often used for that purpose, as well as other substances.

James Aitchison said he went to stables in Hope Street Lane, in response to an advertisement, and bought a horse which he thought would be suitable to drive in a gig. He paid Douglas £18 12s. for it, and got a receipt, which stated that the horse was quiet, sound, and a good worker. He rode it home part of the way, and soon found that the animal was broken-winded, and no use for his purpose at all. It was a perfect roarer. He saw the accused next day, but failed to get the money, obtaining in lieu thereof an I.O.U. for the amount, stating when it would be paid.

Eliza Leslie, the accused's landlady at Montgomery Street, gave evidence; and Alexander Alexander, detective officer in the county, described the means taken to track the prisoner, and deponed as to his arrest at Juniper Lee. Only one witness came forward for the defence, and his evidence seemed to be directed to show that he had sold one of the horses to Douglas. He was a horse-dealer at Newcastle, and sold for £14 10s. a horse at Northallerton.

The jury then retired, and, after an absence of little over five minutes, brought in an unanimous verdict of guilty on all the four charges, the last two having been withdrawn by the Procurator Fiscal.

The Sheriff characterised the verdict as a common-sense one, and remarked that the accused had been found guilty of pursuing a fraudulent scheme to obtain the price of horses which he passed off as sound. It was impossible to believe that these transactions were *bonâ-fide*, and he thought the accused had shown himself to be a very clever and skilful rogue. He passed sentence of eight months' imprisonment with hard labour.—*Edinburgh Evening Dispatch*, Aug. 19th.

DISPUTE ABOUT A "ROARER."

In the action of Strachan *v.* Duncan, raised in the Aberdeen Sheriff Court and some time ago reported in these columns, Sheriff Crawford has issued an interlocutor on the appeal taken by the pursuer. He finds that the pursuer did not represent to the defender that the horse was sound, that the defender examined the horse at the time of the purchase, that the horse was a useful horse, able for farm work. Pursuer was not bound to inform the defender that the horse was unsound in respect of being a roarer. The Sheriff, therefore, repels the defences, and decerns against the defender for payment as concluded for; finds the pursuer entitled to expenses.

In a note Sheriff Crawford says this action is not now defended on the ground that a warranty was given. The law of implied warranty as to quality and fitness now stands on section 14 of the Sale of Goods Act, 1893. Starting from the principle of *caveat emptor*, it specifies certain exceptions; but of these the failure to disclose a defect known to the seller is not one, unless the goods are sold for a particular purpose for which they were not fit, or unless there was no implied warranty by usage of trade (sub-sections 1 and 3). It was not contended, and, I think, could not be contended, that either of these sub-sections apply. There remains the view that wherever the seller fails to disclose a known defect, such failure to disclose is fraudulent. The issue of fraud must, I think, be determined in the light of the facts of each particular case. In the sale of a horse it would, for example, be fraud to disguise artificially a broken knee, or to make an untrue representation that the animal was sound to the best of the seller's knowledge. If my view of the law be right, I do not say that the buyer is placed at any unfair disadvantage. He may demand a warranty. The defender alleged that he had obtained one. He may be satisfied with a representation of the seller's experience or knowledge of the horse. It is not even averred that such a representation was given, or he may demand a trial of a day or two, which is not uncommon. If he takes no such precaution, he depends on his own skill when he examines the horse or has him examined. If the horse were unfit for the purpose for which he was sold, that might, of course, raise a different case. I hold it to be proved (1) that the bargain was not one for the sale of the three horses together for a lump sum, though, I think, there was a genuine confusion in the pursuer's mind on that subject; (2) that the horse's wind was affected to a degree which made him unsound, was, in fact, a roarer; (3) though not with equal confidence that the pursuer was aware of that. It is not impossible that the pursuer, who dealt largely in horses, this one being worked by his sons and servants, was not fully aware that the horse had the habit of roaring and grunting to the actual extent that it had, or to an extent which amounted to unsoundness. However, I assume that knowledge to be proved.

Notes and News.

PUBLIC SLAUGHTER-HOUSE FOR ABERDEEN.—A special committee of the town council have reported that, in their opinion, the time has come for the corporation to erect a public slaughter-house. They recommend the construction of an abattoir at a cost of £30,000, but name no particular site. The committee's report was approved, and the committee were instructed to report as to the best site to be obtained, as well as to other particulars.

TUBERCULOSIS AND PURE-BRED PIGS.—Amongst those who, for various reasons, still believe in the old-fashioned, slow-growing, hard-feeding, and generally unprofitable pigs, an opinion is said to be held that pure-bred pigs are very frequently affected with a wasting disease, otherwise tuberculosis. A recent and most convincing proof has recently been furnished that all pure-bred pigs are not so affected. Some of our most carefully bred herds of pedigree pigs are undoubtedly far more free from all hereditary diseases than the majority of the common pigs of the country. A deputation from the Finland Government has recently visited Great Britain to purchase Ayrshire cattle and large white pigs. One of the conditions of purchase was that all the animals, pigs as well as cattle, should be tested for tuberculosis, and any which reacted should be cast. As was only natural, the herd of pigs first visited was that of Mr. Sanders Spencer, of Holywell Manor, a herd which

has again this season proved itself to be the very best in the kingdom, since we see it announced that at the "Royal," the "Highland," the "Bath and West," and three other of the chief shows, thirty-one class and champion prizes and reserves for champions have been won with thirty exhibits. It was originally intended to buy two boars from one and two sows from a second herd, but the whole of the pigs were subsequently bought from Mr. Spencer, as satisfactory results were not obtained at other herds. A pen of three boars and one containing five young sows were selected at Holywell Manor, and the tuberculin was injected about 10 p.m. on the 26th ult. The temperature of each pig, which was numbered, for identification, was carefully taken, the average for the boars being 30·0 C. and for the sows 39·16 C., the higher temperature of the sows being thought to be due to excitement, owing to their racing about when let out of their stye, whilst the temperature of all the pigs was higher than at subsequent testings; this was probably the result of being caught and handled. The temperature of each pig was carefully taken the following morning about 7 o'clock, and each two hours after, until Mr. Tawela, the veterinary surgeon of the deputation, was convinced that not the slightest taint of tuberculosis existed in the pigs. The variations in the temperature of the various pigs was comparatively slight, that of one boar being from 39·2 to 38·5, and of one sow from 39·4 to 38·5, the highest being in each case the one taken first. The average temperature of the pigs at the various testings was 38·6425 C., or nearly ·3 less than those first taken. Mr. Spencer is to be congratulated on this further and most important proof of the thoroughly sound basis in which he has, for some thirty-five years, managed his large herd of pigs, which has representatives in all parts of the world.

A Dundee Veterinary Surgeon in the Transvaal.—Successful Cure for Rinderpest.—Transvaal papers to hand give accounts of the success which has attended the work of Mr. James Spreull, V.S., in inoculating herds of cattle according to what is known as the French method. Mr. Spreull, who is a son of Mr. Andrew Spreull, F.R.C.V.S., Dundee, went out to the Transvaal towards the end of last year, and on the passage made the acquaintance of two young gentlemen from the Pasteur Institute at Paris, who recommended the new method of inoculation. Mr. Spreull was so convinced of the merits of the cure that he lost no time in putting it into practice, with the result that he may now be said to be the first who has carried the treatment to practical success. The *Barkley East Reporter* of 23rd July, has the following reference to the subject:—"During the past four or five weeks Veterinary-Surgeon Spreull, together with Dr. Wilhelm, of this town, have been busily engaged in various parts of the district in inoculating herds of cattle according to the method discovered by the French experts in the Transvaal—that is, with defibrinated blood. Their labour has been attended with the utmost success, and both Dr. Wilhelm and Mr. Spreull are perfectly convinced that the treatment of inoculation with blood drawn from salted animals is a perfectly reliable one, and that the true antidote or antitoxine to rinderpest is this blood serum. In all cases where healthy cattle were inoculated, and immediately afterwards infected with rinderpest, they contracted the disease, which attained, according to the condition of the various animals, a more or less virulent stage, and then, without exception, the beasts recovered their normal health. The treatment has also been conducted with success in the case of animals which have already taken the disease, but in which the visible symptoms have not yet appeared. It was amongst the cattle of Mr. T. Louw that Mr. Spreull and Dr. Wilhelm first conducted their experiments, and amongst an unclean herd. On the 11th June the disease first appeared amongst a herd of forty-

two animals belonging to Mr. Louw, and by the 19th June two were dead (one having been killed for the purpose of procuring its gall), and nine were sick, with visible symptoms. One of the sick cattle was covered with ulcers, and was left alone, and two others were not touched. The other six were treated with heavy doses of immunised blood from a salted ox. All the animals so treated died, the disease having gained too great a hold on them, but they lived two or three days longer than those not inoculated. Of the remaining thirty-one animals all were inoculated with defibrinated blood, and all recovered, one or two of them reaching the temperature of 108 degrees during the progress of the disease. These gentlemen have also had successful results in one or two cases where they have carried out blood inoculation after animals had been inoculated with bile, when the immunising effect was not produced by the latter treatment; in fact the results from the blood method are uncompromisingly successful, and the method is now being prosecuted with the most indefatigable energy by the hard-working veterinary surgeon, Mr. Spreull. It is stated that under the bile system of inoculation about 50 per cent. of the animals inoculated succumbed."—*Dundee Courier.*

Review.

FORMULAIRE DES VÉTÉRINAIRES PRATICIENS, par Paul Cagny (Paris: I. B. Baillière et Fils).

In preparing this useful little book, M. Cagny, one of the most distinguished and most experienced of French veterinary surgeons—says he has had two objects in view: first, to present a summary of therapeutic principles, taking into account all the most recent modifications of medical theories, and as medical theories and opinions are constantly varying with the extension and increase of knowledge and experience, there is a constant tendency in such books to become antiquated; secondly, M. Cagny determined to group under one heading all the formulæ applicable to the diseases of a given organ. The author hopes thus to save his fellow-practitioners the trouble of turning over page after page of a manual in order to find the proper drug required in, say, a case of pneumonia or enteritis. As M. Cagny says, the preparation of such a book demands long and patient labour; piles of books and heaps of documents must be examined in order to classify and digest the information which they contain and render it available for the veterinarian. We have space only for a brief summary of the contents of this valuable little work.

M. Cagny begins with a short chapter on general therapeutics, and then goes on to speak of the means employed for modifying the external cause of the disease, giving one section to antiseptics and another to parasite-destroyers. He gives a good deal of space to the intestinal worms that infest the domestic animals. Chapter third is devoted to the means used for affecting the digestive apparatus, and other chapters to the nutritive organs, the blood, the circulation, the respiratory organs, the nervous system, the eyes, the skin, the organs of reproduction and lactation. A chapter is devoted to the treatment of cases of poisoning, another to the best means of destroying noxious or troublesome animals, such as rodents, and a final chapter to the use of mallein and tuberculin. The book is furnished with an excellent index, and is very carefully compiled in the most scientific manner. Although we English surgeons trust more to fostering the operations of nature, and less to drugs and medicaments than our French neighbours, still there is no English veterinary surgeon who would not benefit by the possession and by the frequent consultation of M. Cagny's handbook.

Extracts from Foreign Journals.

UNFORTUNATE RESULTS OF INOCULATIONS AGAINST BACTERIAN ANTHRAX IN THE CANTON OF BERNE, IN THE SPRING OF 1896.

DURING a period of eleven years, from 1884 to 1894, out of 48,678 inoculations made against bacterian anthrax, 14 were followed by development of anthrax, *i.e.*, 0·28 per cent. The author observed on the contrary, in 1896, that out of 4,202 animals inoculated up to the 19th April, 123 or 2·92 per cent. died of the anthrax with which they were inoculated; after the 19th April, 3,576 subjects more were inoculated, but none of them died. In all, then, 7,817 animals were inoculated, of which 123 or 1·57 per cent. died of the inoculated anthrax. These unlucky results produced a deplorable effect in the country. M. Strebel wonders to what cause these results should be attributed, and he believes he can explain them by a greater virulence of the vaccine and by the part of the body in which the vaccination took place. The author considers that the region of the shoulder is not suitable; in it the cellular tissue is more plentiful and looser than at the end of the tail; the temperature at that spot is also a little higher; he thinks that the microbes of the anthrax or their spores find there a very favourable medium for their development. From the end of March to the 19th April, 2,618 subjects were vaccinated behind the shoulder, 1,058 in the tail, and 526 in the middle of the space between the neck and shoulders; of these 4,202 vaccinated animals 123 or 2·02 per cent. died from the inoculated anthrax. Of the 2,618 vaccinated in the shoulder, 120 or 4·58 per cent. died; of the 1,058 vaccinated in the tail, 3 or 0·28 per cent. died. No accident happened to the animals vaccinated in the space between neck and shoulders. In order to get a clear idea of these effects, M. Strebel vaccinated, still behind the shoulder, in three different localities and on the the same day, 71 young animals with the same vaccine; the results were disastrous. Four animals succumbed on the third day, a fifth succumbed after 14 days; the disease with which they were inoculated could be observed after 28 to 40 hours. On the other hand, the vaccine prepared at Berne was shown to be too strong, for out of 1,304 subjects vaccinated with it, 86 or 6·60 per cent. died of the inoculated anthrax. In the canton of Vaud 4,070 animals were vaccinated with vaccine from Lyon; five or 0·12 per cent. died of the inoculated anthrax, of which four were inoculated in the shoulder; in the same canton, the subjects vaccinated with the vaccinal product from Berne gave a mortality of 10 per cent. M. Strebel puts the question: Whence this greater virulence? Are the products utilised for the preparation of the vaccine more virulent? or, in other words, have the bacilli of the bacterian anthrax or their spores become more virulent, or has the organism of many bovine animals become less resistant to the action of these microbes, as Arloing and Cornevin think? Both these hypotheses are possible. The author fervently hopes that he may see the preparers of the anthrax-vaccine convinced by the evidence of their own eyes of the degree of hurtfulness of these products before supplying them to practitioners.—*Annales de Médecine Vétérinaire*, quoting from *Schweizer Archiv.*

Communications, Books, Journals, etc., Received.

The Lancet; Land and Water; Veterinarian; Veterinary Record; American Veterinary Review; Journal of Comparative Medicine; Australian Farm and Home; Results of Use of Tuberculin, by James Wilson, M.A.; Bacteriological Diagnosis, by St. John Reid; Country Life Illustrated; Recueil de Médecine Vétérinaire (Alfort); La Presse Vétérinaire (Paris); L'Echo Vétérinaire (Liége); Annales de Médecine Vétérinaire (Brussels); Berliner Thierärztliche Wochenschrift (Berlin); La Clinica Veterinaria (Milan); Il Nuovo Ercolani (Pisa); La Revista Veterinaria (Buenos Aires); Deutsche Thierärztliche Wochenschrift (Hannover und Karlsruhe); Archivos de Medicina Lisbon: José Bastos).